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Discourse Quality in Online Communities

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The Faculty of Economics, Business Administration and Information Technology of the University of Zurich herewith permits the publication of the aforementioned dissertation without expressing any opinion on the views contained therein.

Zurich, April 4th, 2012[1]

The Vice Dean of the Academic Program in Informatics: Prof. Dr. Harald C. Gall

[1] Date of Graduation

We shall not cease from exploration
And the end of all our exploring
Will be to arrive where we started
And know the place for the first time.

Thomas Sterns Eliot, Little Gidding

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Abstract

The Web can be regarded as one of the most influential inventions of recent times. The "Social Web" phenomenon especially, i.e. information exchange and socializing activities among users, has changed the way people interact with each other profoundly. This also has far reaching consequences for the basic models by which information is distributed in our society. The "Gutenberg" model which is characterized by a commercial distribution and rather passive consumption is being increasingly replaced by a "Social Web" scenario in which users are interconnected and are cooperatively producing and consuming content. While the mechanisms of producing and assuring quality are fairly well understood in the "Gutenberg" model, we are just beginning to understand these mechanisms for "Social Web" scenarios.

In this thesis, we would like to contribute to the understanding of quality in community-based Social Web platforms. We will start by proposing a measuring framework for discourse quality in online communities. We use the term *discourse quality* rather than the more traditional term *information quality* to recognize the fact that - in addition to information exchange – socializing activities are an important part of Social Web platforms. Our measurement framework will comprise three main dimensions: *discourse completeness*, *discourse timeliness and correctness* as well as the *internal discourse quality*. We will conceptualize each of these dimensions and will demonstrate how they can be measured empirically. By conducting these measurements for the domain of travel-related information, we will contribute to the question how good the discourse quality of Social Web platforms is in comparison to the information quality of commercially printed books. Thereby, we are contrasting these two basic information distribution models.

The results will reveal that Social Web platforms have the potential to produce a discourse quality that is as high as the information quality in commercial products. However, this does not hold for all Social Web platforms and it is, up to now, unclear which platforms are better than the traditional information distribution model and why. We will therefore undertake a number of exploratory studies that target the characteristics of the online community landscape in the travel domain as well as the assumption that community activity and community scope are crucially influencing discourse quality. These exploratory studies will lead to the proposition of a first normative theory that seeks to explain the influencing factors of discourse quality. Finally, we will use these theoretical findings to implement a Meta-Community platform that can be used to guide Web users to areas with a high discourse quality on the Social Web.

CONTENTS

PUBLICATIONS

Parts of this thesis have been published in the following articles:

Aschoff, F.R. & Schwabe, G. (2011). The Activity-Scope Approach – Towards a theory to explain online discourse quality in online communities. Unpublished Manuscript. University of Zurich. 2011.

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Aschoff, F.-R., Schaer, V. & Schwabe, G. (2011). Where should I send my post? The concept of discourse quality in online communities and its dependency on membership size. Proceedings of the 5th International Conference on Communities & Technologies (C&T 2011). Full Paper. Brisbane, Australia, June 29th - July 2nd, 2011.

Aschoff, F.-R., Aschoff, M. & Schwabe, G. (2010). The market for online tourism communities. Proceedings of the 18th European Conference on Information Systems (ECIS). Full Paper. Pretoria, South Africa, June 6th - 9th, 2010.

Aschoff, F.-R. & Schwabe, G. (2010). MetAgora - A Meta-Community Approach to guide Users through the Diversity of Web Communities. Extended Abstracts of the ACM Conference on Human Factors in Computing Systems (CHI 2010). Atlanta, USA, April 5-10, 2010.

Aschoff, F.-R. & Schwabe, G. (2009). On the evolution of online tourism communities. Proceedings of the 17th European Conference on Information Systems (ECIS). Research-in-Progress Paper. Verona, Italy, June 8-10, 2009.

Aschoff, F.-R. (2008). Online Tourism Communities. Doctoral Proposal presented at the Doctoral Consortium of the International Conference of Information Systems (ICIS 2008). Paris, France, December 11-14, 2008.

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Prestipino, M., Aschoff, F.-R. & Schwabe, G. (2007). How up-to-date are Online Tourism Communities? An Empirical Evaluation of Commercial and Non-Commercial Information Quality. Proceedings of the 40th Hawaii International Conference on System Sciences (HICSS-40). Full Paper. Waikoloa, Big Island Hawaii, January 3-6, 2007.

Prestipino, M., Aschoff, F.-R. & Schwabe, G. (2006). What`s the use of guidebooks in the age of collaborative media? Empirical evaluation of free and commercial travel information. Full Paper. Proceedings of the 19th Bled e Conference "eValues". Bled, Slovenia, June 5-7, 2006.

I) INTRODUCTION AND OVERVIEW

The Internet is widely regarded as one of the most important innovations of the last decades. Due to its memory capacity and its ubiquitous access, the Internet allows for information storage and exchange on an unprecedented scale. The usage patterns of this multi-purpose platform have undergone considerable changes since the inception of the Internet in the 1960s and the development of the World Wide Web in the 1990s. Early visionaries of the computer science field repeatedly pointed towards the potential of networked computer systems as facilitators for human communication. Licklider & Taylor (1968*),* for example, refer to "interactive multi-access computer communities" and described the social networks and online communities that exist today with astonishing precision. For the broad masses during the 1990s, however, the Web remained a huge and somewhat obscure document archive. The usual interaction pattern was characterized by a relatively passive download of files or websites, rather than an active exchange among users. This interaction pattern changed with growing bandwidths, flat rate payment models and a higher penetration of Internet accesses around the year 2000. These developments enabled users to spend more time on the Web and to upload and exchange multimedia content like pictures, music files and videos. Furthermore, it allowed them to socialize with other users in online communities and social networks. Thereby, the Web turned more and more from a document library into a platform for social exchange.

Thus, if the Web has a history of 20 years – starting with Tim Berner-Lee's implementation of the hypertext transfer protocol in the early 1990s – one could argue that roughly the first ten years were dominated by a different usage pattern than the second ten years. For the broad masses, we would characterize the first ten years of interaction with the Web as an *"information retrieval scenario"* during which the users mainly used the hyperlink structure to retrieve webpages that were created by educational institutions or commercial companies. The second ten years after 2000 are characterized by what we call a *"Social Web scenario"*. This scenario is social in the sense that it is characterized by an exchange among Web users. This exchange can mean an exchange of files (e.g. pictures, videos, music), an exchange of knowledge or a social exchange on numerous community platforms. As a symbolic date that marked the beginning of this new phase, we would take the launch of Wikipedia by Jimmy Wales and Larry Sanger in 2001.

The *Social Web scenario* brought the users of the Internet closer together and at the same time started to transform the basic models by which information is distributed in our society. While it is always dangerous to make epochal statements about one's own

time, there are many indications that the evolution of the Social Web will indeed end the "Gutenberg era" as already predicted by Marshal McLuhan in the 1960s (McLuhan 1962). McLuhan argued that the invention of movable type printing by Gutenberg around 1450 had profound impacts on the social cognition of man and, thus, deeply influenced societies of the modern age. In addition to this, McLuhan regarded the invention of typography as a harbinger of the industrial age. The invention of typography introduced a business model of information distribution that was in place for about 500 years. This business model is based on institutions (publishing companies, newspapers, bookstores etc.) that provide media. These media are then bought and consumed by individuals without much of a direct feedback loop to the original creator of the information. Part of this business model was based on the fact that one needed a printing press as well as distribution channels to distribute information, and this was usually only affordable or manageable by institutions and not by individuals. The Web changed these constraints by providing every user with a personal printing press as well as with the required distribution channels.

The new ways of distributing information in the *Social Web scenario* differ considerably from the processes during the "Gutenberg era". The new way is a community-based approach. This means that everybody is allowed to contribute and institutional quality assurance does not apply. The tremendous activity that has developed on Social Web platforms in recent years has led to the question whether the content that is produced by this new production model can actually be of the same quality as the content that is produced by the "Gutenberg" model. Initial findings regarding this question show that Social Web-based platforms do have enormous potential and can offer equal or even superior information quality compared to commercially printed books. This, however, does not hold for all platforms – some offer a high content quality and, thus, are very useful for Web users while others only show inferior quality. These findings also show that while we have a fairly good understanding of constraints and influencing factors of the "Gutenberg" distribution model (i.e. institution-based media production) our understanding of the new Social Web or community-based production model is just beginning to develop. In this thesis, we would like to make a contribution in this direction.

1.1 Research questions and research contributions

When we contrast the "Gutenberg" distribution model to a community-based distribution model and situate these approaches in the Web's history, we could argue that the first ten years of the Web (described above as *information retrieval scenario*) largely follow the Gutenberg distribution model. Even though users did not usually pay to see a webpage,

institutions provided information for end-users with hardly anything in terms of a feedback loop and with little interaction among these users. This scenario is characterized by someone who enters a library and uses catalogues to look for books about a specific topic, just as in the Gutenberg era.

The Web search engines that were developed during the 90s more or less followed this paradigm. One could enter key words on a certain topic and numerous related webpages would be returned. The development of these search engines played a crucial role in the evolution of the Web. Without the "access efficiency" they provided for Web users, the Web as we know it today would hardly exist. Basically, these search engines use two approaches to provide relevant and useful websites: a) techniques that match available websites as well as possible to the information need of the Web user and b) approaches that distinguish more useful Web pages from less useful ones regardless of the query that is entered by the user (cf. Lewandowski 2005). Brin and Page (1998) proposed the so-called PageRank algorithm for the second task and were able to create a considerable competitive advantage in the search engine market with this approach. The PageRank algorithm considers the number of incoming links to a page and also considers the "trustworthiness" of the linked pages by analyzing their link structures as well. Thus, the PageRank approach applies the idea of the citation index from scientific fields to the Web-based hypertext scenario. In this sense, one could argue that the PageRank algorithm is already a Social Web application or a community-based approach since it uses the entire Web-community to assess the quality of Web sites. Regarding the interaction with the user, however, these kind of search engines still stick to the library paradigm of the Gutenberg era: Someone would like to get a document (report, book, webpage etc.) and as a result of her search she receives a list of possible documents. The Google search engine as well as other search engines have been very successful and are some of the most used applications on the Web. Thus, we could argue that the Gutenberg or library scenario on the Web based on document retrieval is well supported by existing technologies.

In this thesis, however, we argue that the respective correspondents of information usefulness or information quality are not well understood with regards to the community-based scenario. A community-based Web scenario can take many forms (see Chapter 2 for the respective overview). At this point, we refer to the community-based scenario meaning a form of exchange where people engage in a discourse about a certain topic. This discourse evolves through the exchange of statements among two or more participants. The topic can, for example, be traveling, computer technology or cooking. Typical support platforms for these kinds of communities are mailing lists or forums. On

these platforms the interaction usually starts with someone sending a post (e.g. a question) and others can reply to this post, whereby a thread of posts is created. The perspective on this kind of community interaction introduces another two perspectives: the *discourse-oriented* perspective vs. the *document-oriented* perspective. The discourse-centered exchange that became possible through the Web among a large number of users differs considerably from the Gutenberg distribution model of information. One decisive difference is that the community model disintermediates entire institutional structures like publishing companies, libraries and bookstores. The communication becomes much more direct among individuals. If we want to understand this new community-based scenario of communication and information distribution and compare it to the traditional model, we have to understand how information or discourse quality in these scenarios can be defined and measured. For the community-based scenario, we will use the term *discourse quality* instead of *information quality*. This decision was based on the fact that not only information exchange but also socialization are the motivations behind the use of community-based platforms. They are also used intensely for socializing purposes. Therefore, only focusing on "information quality" would fail to grasp what actually happens on these social platforms.

The aspect of quality has possibly been successfully conceptualized for Web 1.0 scenarios, but not for Web 2.0 scenarios. In this regard, we argue that the aspect of quality itself has not been convincingly conceptualized for social community-based scenarios. In order to do this, we will take the discourse (i.e. the exchange of statements in online forums) as a focal point of our research. We will conduct this research in the domain of travel-related information. Tourism and travel-related information has always been a driver of the development and the (commercial) use of the Web. Traveling is an information-intense activity and travel products are usually experience goods, which means that their quality can only be assessed during or after consumption but rarely at the time of the purchase. This leads to the need for judgments made by fellow travelers and fuels the activity of numerous online travel communities on the Web. We chose to concentrate on one domain to be able to develop constructs that benefit from the in-depth understanding of this domain. However, we always sought a level of abstraction that should it make it possible to transfer our concepts and theoretical reasoning to online communities of any domain. Thus, the first research question of this thesis is:

Research Question 1: How can we conceptualize and measure discourse quality in online travel communities?

To this end, we will propose a measuring framework for discourse quality that comprises three central dimensions: *Discourse completeness*, *discourse timeliness and correctness* as well as the *internal discourse quality*. *Discourse completeness* as well as *discourse timeliness and correctness* are variables that connect the information in an online community (or more generally in any media source) with the information in the "real world". The rationale behind this concept is to compare the information in the media source with the information that describes the "real world" facts. The internal discourse quality could be described as the "internal information service level" of an online community. It comprises variables like the probability of receiving a reply to a submitted post, the waiting time until a reply is received as well as the consistency of the thread that makes up the reply. We will conceptualize each of these dimensions and will demonstrate how these dimensions can be measured in an empirical context. As discussed, our conceptualization of discourse quality is especially targeted on the information exchange in online communities but has been developed from concepts of the traditional information quality research field. This will allow – at least for those two dimensions that relate the information in the media source with the information in the "external world"– to compare the resulting discourse in online communities with the information quality of traditional print products. Regarding the interaction patterns, online forum communities obviously differ from traditional print products. Thus, part of the challenge is to find research settings that allow a comparison of discourse quality in online communities with the information quality of commercial print products. Online communities have certain advantages. For example, members are able to formulate a specific and personal information request in the form of a question and send it as a post to the community (see Section 2 for an elaboration of these advantages). However, whether, besides this advantageous interaction pattern, users end up with a comparable or possibly even superior quality of the retrieved information when compared to traditional printed books, has hardly been investigated. Thus, we ask:

Research Question 2: How does the discourse quality in online travel communities compare to the information quality of commercially produced travel books?

The results of our systematic evaluations show that online tourism communities on average do have a comparable level of content quality compared to commercially printed products. However, online communities show considerable variance regarding their quality. Some online communities show a better quality than their commercial counterparts while others show an inferior quality. Furthermore, post-hoc analyses point

to moderating variables of quality in online communities such as the activity level of a community as well as the scope of this community. This result shows that user-generated content is on principle able to reach a quality level that could threaten the business models of traditional publishers. However, up to now, established brands like the Lonely Planet publishing group have an important advantage: The uncertainty of the user or consumer regarding the quality he or she finds in online communities. From a research perspective, these results show that while quality assurance mechanisms are fairly well understood for traditional production processes, these quality mechanisms are hardly understood for community-based content creation scenarios.

The measuring framework we propose for Research Question 1 allows for a systematic comparison of discourse quality among online communities. However, such kind of comparisons can be misleading if an overall understanding of the phenomenon is lacking. Therefore, we will undertake a number of exploratory studies that target the characteristics of the landscape of online travel communities as well as member activity and community scope as influencing factors. We have to recognize that online communities are not isolated entities but that they interact with other online communities on the Web. This interaction can have considerable influence on the evolution of online communities as well as on the discourse quality these communities are able to provide. Therefore, we ask:

Research Question 3: What are characteristics of the landscape of online travel communities with respect to member activity, community scope and discourse quality? and:

Research Question 4: What are influencing factors on online discourse quality and how can these influences be explained?

These exploratory studies will finally lead to the proposal of our Activity-Scope approach. This formative theoretical approach seeks to explain the emergence of discourse quality in online discourse spaces. The central elements of the theory are the number of members of the discourse space as well as the topical scope of this discourse space. The theory explicates how four crucial factors interact with these two elements: the common ground, the contribution incentives, the information overload as well as the social cohesion.

As we will discuss in more detail in the section about research methods, the discipline of information systems research has an economic tradition, which explains its roots in the social sciences, as well as a computer science tradition, which explains its

self-conception as an engineering discipline. For the last aspect of this thesis, we will turn to a more design science oriented view. This final section deals with the question how the empirical findings of the previous sections can be put to practical use. This perspective sets the research approach in the context of Web Information Retrieval. It will propose a technological artifact, i.e. a platform to guide users to areas with high discourse quality on the Social Web.

Research Question 5: How can we support users in finding spaces with a high discourse quality on the Social Web?

Contribution of this thesis

The contributions of this thesis are the following:

1) *Discourse Quality Framework:* We propose a measurement framework for discourse quality in online communities. This framework identifies crucial dimensions of discourse quality, conceptualizes these dimensions and demonstrates how they can be measured empirically. This measuring framework can be used for a number of purposes: Online community administrators can use this framework for their internal quality control. Thus, they can, for example, try to improve those discourse quality variables that are critically low. In addition, they can use the measuring framework to signal the quality of their communities to (potential) community members as well as to business partners who might be interested in investing in the community or to use it as an advertisement space. The measuring framework will provide benchmark values for a number of variables (e.g. the probability of receiving a reply or the waiting time until the reply is received). A rough estimation of these variables can easily be made by studying the archived communication of any forum community. This allows Web users to judge the discourse quality of a forum community they found on the Web against the benchmark values that are provided by our framework. Therefore, the framework and its benchmark values could lead to better and more informed decisions when Web users are looking for helpful online communities. Finally, the framework is valuable because it conceptualizes the construct of discourse quality for the online community research field. Every theorizing starts with a thorough conceptualization of the phenomenon of interest. This provides a reference point for the communication about a certain phenomenon among researchers. Our framework is designed to be a starting point in this direction.

2) *Empirical methods for a systematic comparison of community-based and commercially-based information distribution models:* One of the challenges in our

context is to conduct a meaningful comparison between the content quality that emerges from the discourse in Social Web scenarios and the content quality that emerges from print products. We will propose a number of approaches that can be used for future comparisons of these general information distribution models. Our results give a systematic account of today's differences between commercial and community based models. We show that community-based information distribution models can already be regarded as a substitution thread for the traditional publishing model. This deepens our understanding of the community-based distribution model, sheds light on the high variability of quality that communities still demonstrate and provides first hints regarding variables that influence the quality level of online communities.

3) *Characterization of the online travel community landscape as well as influencing factors of online discourse quality:* In an exploratory approach, we deepen the understanding of influencing factors on the discourse quality in online communities. We undertake a number of exploratory studies that target the characteristics of the landscape of online travel communities as well as the assumption that member activity and community scope are factors that crucially influence the discourse quality. Thereby, we also introduce a multiple community perspective that has rarely been used in scientific studies up to now. As a result we can give a description how the entire online travel community landscape evolves and how online travel communities are related to each other.

4) *Proposal of a formative theory to explain influences on discourse quality in online communities:* Based on these exploratory results, we propose our Activity Scope approach, which seeks to explain how discourse quality emerges in online communities. The central elements of the theory are the number of members of the discourse space as well as the topical scope of this discourse space. The theory explicates how four crucial factors interact with these two elements: the common ground, the contribution incentives, the information overload as well as the social cohesion. This theory is meant to explain the interrelations of these variables and can also be used to predict the discourse quality of discourse spaces in online communities.

5) *Demonstration of the usefulness of the discourse quality approach in a Web Information Retrieval Scenario.* We use our empirical findings to propose a meta-community platform to guide users through the plethora of Web communities. Thereby, we seek to provide a new perspective on Web Information Retrieval and Human-Web

Interaction and extend previous approaches in these areas. Thereby, we seek to extend the document-centered view of human-web interaction by a discourse-centered view and show how users can be led to areas of high discourse quality on the Social Web. The approach is implemented as a functioning Web platform and is evaluated in a proof-of-concept study.

1.2 Research methods

To understand the research methods that become predominant for a certain research field, it can be helpful to understand the scientific disciplines that influence this field. Figure 1.2.1 shows three scientific disciplines that have had a crucial impact on the evolution of the information systems research field.

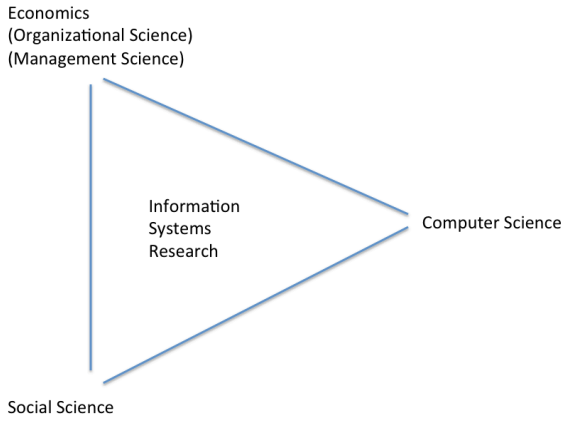

Figure 1.2.1: Scientific disciplines influencing the information systems research field

The information systems research field can be conceptualized in a tension zone between a behavioral social science paradigm and an engineering (computer science) paradigm. Brooks (1996) puts the underlying premises of these two approaches in a nutshell by formulating that "the scientist builds in order to study; the engineer studies in order to build." Thus, while the methods for both approaches can be quite similar (e.g. conducting interviews, building prototypes etc.), Brooks points out that the understanding of the ultimate goal of these endeavors is different. The scientists' final goal would be eternal truth while the engineer's final goal would be to build the rocket.

The information systems field has a history of debates about the dominance of these two approaches. Traditionally, United States universities followed more the idea of information systems as a behavioral science (often in combination with regression

analysis or econometrics, as they are popular in economics). Many European scholars, on the other hand, tended to stress the importance of the IS field as an engineering discipline.

In addition to this tension zone between science and engineering, we distinguished between economics and social science. This distinction is debatable because economics can also be regarded as a behavioral social science. However, we chose these two disciplines as corners of our triangle to stress the different perspective these two fields have on their subject of study. Social Sciences (hereby we refer mainly to Sociology as well as Psychology) analyze human behavior with a special focus on the relationships among individuals. This research perspective is a broad one in the sense that human behavior is not researched under the consideration of limited materialistic resources that could also influence behavior. Economics, on the other hand, is indeed a special case of social science. It conceptualizes human behavior under the consideration of limited resources, which introduces aspects like a drive to possess these resources (see Section 2 for a discussion of the homo economicus assumption) and competition. This also leads to the perspective of organizations that are established by individuals to cope in a world of limited resources. The individual as part of an organization (that usually has to compete in a market) is therefore a central element of information systems research.

Regarding the tension zone between science and engineering, Hevner et al. (2004) made a widely received contribution by proposing a framework for information systems research. This framework can be understood as an attempt to integrate the science perspective as well as the engineering perspective within the information systems research field (see Figure 1.2.2).

The framework calls for the development of theories and artifacts which help to understand important issues in the information system environment (relevance) and should be based on well-founded scientific methods (rigor). This framework is helpful by combining the two worlds of science (-> theory) as well as engineering (-> artifact). Our methodological approach comprises the development of a measuring framework for discourse quality, an exploratory investigation of this phenomenon as well as a first attempt to develop a normative theory of discourse quality. In addition, we demonstrate the implementation of a platform by using findings from our empirical theoretical level to develop a useful software artifact. Nevertheless, we would not argue that we do design science research in a narrow sense as proposed by Hevner et al. (2004). Hevner & Chatterjee (2010) define design science research *as a research paradigm in which a designer answers questions relevant to human problems via the creation of innovative artifacts, thereby contributing new knowledge to the body of scientific evidence. The designed artifacts are both useful and fundamental in understanding that problem.*

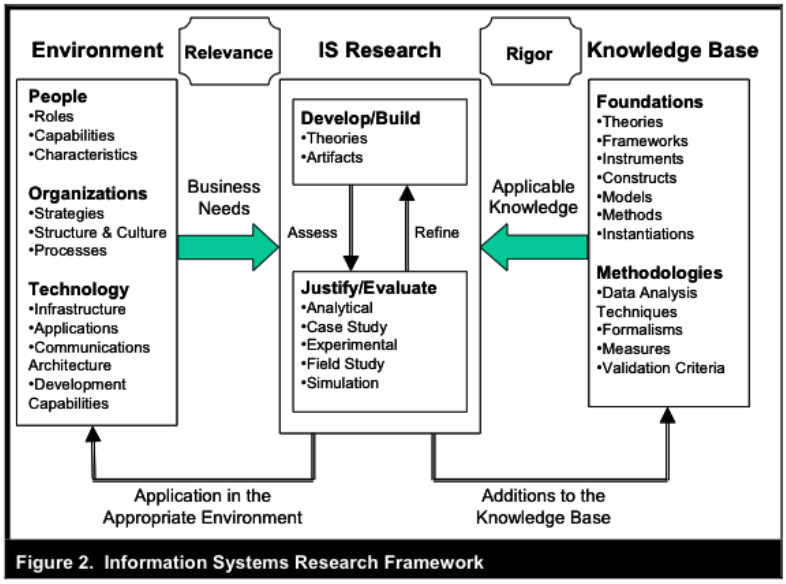

Figure 1.2.2: The information systems research framework by Hevner et al. (2004)

Accordingly, Gregor & Jones (2007) argue that an Information Systems Design Theory *shows the principles inherent in the design of an IS artifact that accomplishes some end, based on knowledge of both IT and human behavior.*

The empirical and theoretical findings of our contribution can be used as an important part of the design of meta-community platforms to guide users through the plethora of Web communities (as demonstrated in Section 6). The other contributions of our thesis, however, are not necessarily connected to the design of a system. The exploration of the concept of discourse quality and the influencing factors as well as the first approach to formulate a normative theory can be seen as a distinct contribution that is disconnected from design aspects. From the beginning, however, we intended to formulate the concepts and connections on a level of abstraction that would allow us to use the empirical findings and theoretical assumptions in software platforms. Therefore, we propose a structure for this thesis that we call the theory-technology cycle. In the following sections we will describe this structure, pointing out similarities and differences to the framework proposed by Hevner et al. 2004.

The theory level and the technology level

A project that follows the theory technology cycle should move between two levels: the theory level as well as the technology level as depicted in Figure 1.2.3. In accordance

with Briggs and Schwabe (2011), by theory we mean a *deductive nomological theory*. This theory is characterized by axioms as well as propositions and can be falsified with empirical data based on the critical rationalistic approach as proposed by Popper (1935). By "theory level", we do not mean that only pure theorizing has to be carried out on this activity level. We call this level theory level because in accordance with Hevner & Chatterjee (2010) and Carlile & Christensen (2004) we argue that the final goal on the theory level should be a normative theory. Carlile & Christensen (2004) argue that there should be the following phases: descriptive theory building including observation, classification and defining relationships. After these descriptive phases the authors suggest a normative theoretical phase that seeks to explain what *causes* the outcome of interest. Exploratory research should lead up to this level and is a crucial approach to develop an in-depth-understanding of a specific domain. Exploratory research should thoroughly describe the phenomenon of interest as well as the variables that are deemed to be important in a respective context. Theorizing without this exploratory phase is likely to miss crucial aspects. A failure to do or recognize exploratory research can, thus, increase the likelihood that theoretic assumptions will either not be supported by empirical data or will fail to address variables that are actually important for a phenomenon of interest. An important requirement for exploratory research to produce meaningful results is the aspect of *concatenation* (cf. Stebbins 2001, 2006). Concatenation means that exploratory studies should increasingly enrich the understanding of some phenomenon or some relationship among variables. This means that subsequent studies should built upon previous studies to collect cumulative evidence about certain assertions. The end of this chain of studies should or could be the formulation of a normative theory. In this thesis, we tried to recognize this aspect of cumulative evidence especially regarding the activity-quality assumption. This assumption, i.e. that member activity is a crucial influencing variable for quality in online communities, emerged during our first empirical studies, which we will report in Section 4. Empirical evidence for this influence could be found in studies concerning discourse completeness as well as in studies concerning discourse timeliness. Therefore, we chose to undertake a more controlled study (Section 5) to further explore this assumption and finally included it into our Activity-Scope theory (Section 7).

By technology, we mean tools that can be used by the end-users of some chosen usage-scenario to influence and control the informational environment usual within an organizational setting. These tools will, in the IT-context, usually be programmed Software/Hardware applications but could also be paper-based standard forms or dossiers

as they are used in many office environments. Thus, the technology level directly attacks the end-user application scenario and seeks to serve the end users' needs.

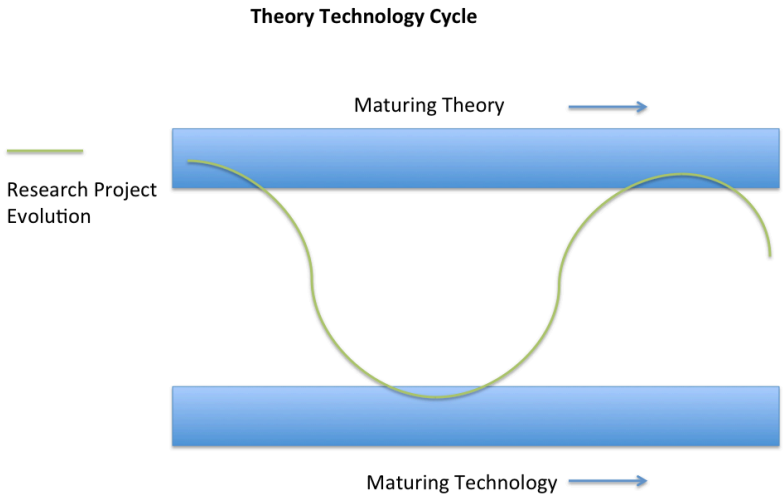

Figure 1.2.3 The theory technology cycle

Where to start?

The theory-technology cycle can start either at the theoretical level with a gap in research in the social or organizational sciences or it can start from a technological perspective with some concrete problem. A research project following the theory-technology cycle, however, should operate on the theory level as well as on the technology level during the course of the project.

What can be the nature of the problem?

Problem relevance is one of the guidelines in the research framework by Hevner et al. The rationale behind this requirement is that research should have an impact and that research money should not be spent on problems that are not actually relevant from an organizational point of view. Therefore, the relevance of the addressed problem should be clearly formulated, preferably supported by empirical evidence.

While the demand for relevance is understandable, this aspect also touches on the difficult issue of the innovative potential of research approaches. Disruptive solutions to today's organizational structures might not be justifiable by data from today's organizations (cf. Christensen 1997). One example might be corporate social software that currently emerges from the Facebook scenario, which had initially not been developed for an institutional setting. The idea is well reflected in a quote by Paola

Antonelli who said that "Good design is a renaissance attitude that combines technology, cognitive science, human need, and beauty to produce something that the world didn't know it was missing."[2] Thus, we argue that science should be able to propose disruptive solutions as well, which, however, need to be communicated plausibly with some vision of an expected benefit.

Empirical Evaluation

Regarding the empirical evaluation, we are in line with the framework by Hevner et al. arguing the solution should be evaluated in an empirical setting. Regarding the theory-technology cycle, we argue that we need two levels of empirical evidence. The data that supports the theoretical core propositions as well as the data that confirms the usefulness of the software artifact that uses insights from the theoretical level.

What is the advantage of the theory-technology cycle?

The rationale behind the theory-technology cycle is that theorizing is forced to solve practical problems. The demand that theoretical considerations should be implemented in a software system forces the theorizing process to continuously reflect on the usefulness of the theoretical implications. The switch between the theoretical level and the technological level serves the following purposes: The theorizing activities are forced to reflect on the usefulness of their goals; technology advancement benefits from well-grounded and empirical based solutions rather than from a sequence of ad-hoc attempts. Finally, we believe that the theorizing process can benefit from the experience the researcher gains when implementing his software and from the feedback of the users of the implemented prototype. It sharpens the view for applicability but it can also sharpen the view for further theoretical propositions. Thus, the theory-technology cycle prevents scientific theorizing from remaining in an ivory tower and demands that science plays its core role, which is to make this world a better place.

1.3 Outline of the thesis

The structure of this thesis is based on the theory-technology cycle. First, we will start by giving a background summary of research findings regarding online communities. In Section 2.1 we will analyze the structural differences between community-based content production and commercial content production. In Section 2.2 we will give a literature overview of research findings regarding online communities in our application domain,

[2] Quoted in Hevner & Chatterjee (2010)

i.e. traveling. To structure this section, we will use the self-determination theory proposed by Deci & Ryan (2000) because it can be well applied to the characteristics of the backpacker or the independent traveler. In Section 3, we will give an overview of fields and studies that are related to our concept of discourse quality, thereby describing the research gap and motivating our approach.

In Section 4, we will propose our measuring framework for discourse quality in online communities. The main dimensions of this measuring framework include *discourse completeness*, *discourse timeliness and correctness* as well as the *internal discourse quality*. We will conceptualize each of these dimensions and we will show how they can be measured in an empirical context, thereby answering Research Question 1. The measurements of the two dimensions discourse completeness and discourse timeliness will compare community-based content creation with commercial content production (targeting Research Question 2.) The results will reveal that online communities are on principle able to realize the same or even a higher discourse quality than traditional print media. However, the discourse quality in online communities varies considerably and the comparative studies point to the activity of the community members as an important mediating variable for discourse quality. Thus, while we have some understanding how quality is created and assured in traditional production processes, we only have a limited understanding how this is achieved for the community-based information distribution model.

To improve this understanding, in Section 5 we will undertake a number of exploratory studies that target the characteristics of the landscape of online travel communities with respect to member activity, scope of the community and discourse quality.

In Section 6, we will move from the theory level to the technology level. We present a meta-community platform that guides Web users to communities with high discourse quality based on member ratings of communities as well as a community quality indicator that is based on the activity-quality assumption. This platform has been implemented and a first proof-of-concept evaluation shows that test-users appreciate the potential of the platform.

In Section 7, we move back to the theory level. We propose our Activity-Scope approach to explain discourse quality in online communities. This theory has two central elements: the aspect of the number of members and the topical scope. Furthermore, it explicates how these variables are influenced by common ground, contribution incentives, information overload as well as social cohesion.

In Section 8, we will provide an outlook on how the theoretical assumptions of the activity-scope theory can be transformed in the next technological cycle. Finally, section 9 discusses our results and the implications for future online community and Web research.

II) BACKGROUND: ONLINE COMMUNITIES

Even though the buzzword “Web 2.0” (O'Reilly 2005) has brought the social aspects of web usage to a broad attention, the usage of the Web as a social facilitator is actually much older. The notion of a Social Web insinuates that the Web can be an important factor in enabling social connection among users rather than just being a document inventory with informational value. Early accounts of the Web as a social platform were given by Howard Rheingold in his widely received book "Virtual Communities" in 1993 where he describes his experiences with the virtual community, the Well. This community had developed in the San Franciso Bay area since 1985. In this book, Rheingold vividly described the fact that social relations could emerge between persons that had only met in a virtual space. The notion of a virtual or online community, obviously, was borrowed from the notion of a community as it had been known in villages and greater cities since ancient times. Due to the social and multi-faceted aspect of the phenomenon, a widely accepted definition of a community as well as an online community is still lacking, even though numerous approaches exist. These definitory efforts also include the aspect whether online communities are to be regarded as real communities or not. Regarding this aspect, Bruckman points out that *"much ink has been spilled trying to work out which online communities are real communities"* (cited in Preece & Maloney-Krichmar 2005). Rather than further increasing the number of definitions, she suggests accepting community as a concept with fuzzy boundaries that is rather defined by its membership. We will follow this advice in this thesis and will not propose another definition of the concept of online communities. We will take Preece’s (2000) characteristics of an online community as orientation for an understanding of the community concept. These characteristics include people, purpose, policies and computer systems and will be discussed in more depth in the following sections.

The multitude of definitions for the concept of an online community is accompanied by the multitude of domains for which online communities are available as well as the multitude of perspectives from which they have been researched. Online communities on the Web cover domains such as computer programming, cooking, statistics as well as gaming, and much socializing and free knowledge exchange takes place on these platforms. Consequently, the potential of these communities has been realized in many areas like knowledge management (Karboul 2002), workplace cooperation (Wenger 1998), education as well as economics & marketing (Hagel & Armstrong 1997).

This pervasiveness of online communities has led to the situation that Web users draw on the information from online communities as well as from multiple other online and offline sources. This leads to the question how reliable and accurate this information is compared to other sources. To explicate some basics in this direction, we will analyze the different content production processes as they occur in online communities and contrast it with commercial production processes in Section 2.1. Subsequently, in Section 2.2 we will give an overview of the scientific literature regarding online travel communities. In Section 1, we pointed out that an exploratory approach followed by a more formal theorizing process seems promising in order to arrive at accurate and useful theories. Since we chose the domain of online travel communities for our exploration and theorizing process, we found it important to give a rich background on online travel communities. We assume that online communities are not used by all tourists to the same degree. Online communities are especially well suited for independent travellers or backpackers with their continuous need for information as well as their motivation to get in contact with each other. This behavior of independent travelers is especially well reflected by the self-determination theory of Deci & Ryan (2000) that proposes competence, autonomy and relatedness as three innate psychological needs. For these reasons we will structure the literature overview on online travel communities according to the three innate psychological needs of this theory.

2.1 Community-based content production vs. commercial content production

The community-based content production process differs in a number of aspects from the commercial content production process. In this section, we will highlight the following aspects for each of these two approaches: The aspect of a (coordinated) division of labor and the idea of the production process (2.1.1), property rights and individual motivation (2.1.2), as well as the selection of contributors (2.1.3). In Section 2.1.4, we will focus on comparing the quality assurance processes of the two distribution models.

2.1.1 The aspect of a (coordinated) division of labor and the idea of the production process

McLuhan (1962) regarded Gutenberg's invention of typography as a crucial invention that influenced the centuries to come. He also described this invention as the harbinger of the industrial age by claiming: "The invention of typography confirmed and extended the new visual stress of applied knowledge, providing the first uniformly repeatable *commodity,* the first assembly-line, and the first mass production." (ibid.) The distribution of knowledge in societies that reached a turning point with Gutenberg's invention has

undergone substantial changes during history and was influenced by culture, political systems and available technology. Ancient Greece is often perceived as a place of philosophical debate and fruitful knowledge creation and exchange. However, we have to be aware that this exchange of fruitful knowledge was reserved for a few citizens of the upper class, while a broad mass of slaves were excluded. In contrast to ancient Greece, the Middle Ages have a reputation of being a time of dogmatic and biased knowledge discourse. Members of the aristocratic, as well as the clerical, class monopolized knowledge during those ages, while the broad mass was largely excluded. This was especially immanent when considering the weekly sermons that were held in Latin, a language not spoken by the majority of the population.

The foundations for an industrial distribution of knowledge were then created by Gutenberg with his "movable type" printing press around 1450. This innovation laid the foundation for printing media and thus for the books and newspapers that started to emerge in the centuries to come. Regarding the participation of the masses in the knowledge discourse and the processes of how goods are created and distributed, two crucial developments occurred in the 20th century: the rise of mass media and the extensive idea of division of labor that was connected to the industrial revolution.

The creation of most products is characterized by a process that constitutes a coordinated division of labor. This idea of division of labor has existed for a long time (e.g. between a master craftsmen and his assistants), however it became especially prominent during the industrial revolution (starting in England during the middle of the 19th century). This epoch of technological innovations for the production processes led to the situation that machines could play a role in a coordinated division of labor process (see Charly Caplins "Modern Times" for a critical portrayal of these developments). These developments led to more complex products that needed a higher degree of specialization. A consequence of these changes was elaborated concepts for the division of labor as, for example, proposed by Taylor (1911). The idea that work steps needed to be coordinated within a factory and that persons should specialize in ever more specific niche domains characterized the industrial manufacturing process during the remainder of the 20th century. These developments were important for all industrial goods but also for print products. All of these goods went through a serial value chain in which each participant added a pre-defined and specific value to the product. Figure 2.1.1 shows the main stakeholders of this value chain for the selling of books.

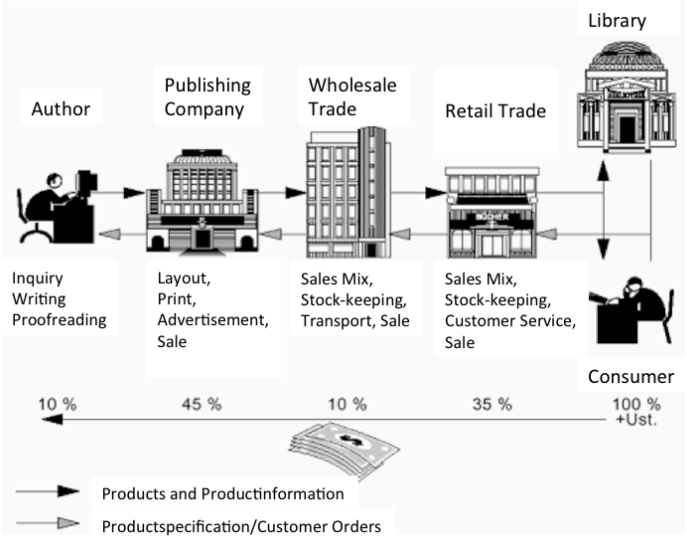

Figure 2.1.1: Value chain for the book sector (taken from Hansen & Neumann 2005, p. 616, translated into English by author)

The greater efficiency that was sought by Taylor and the industrialists of the early 20th century can, in other terms, also be described as the attempt to lower transaction costs. Transaction cost is a term that became crucial in New Institutional Economics (for an overview cf. North 1993, Klein 1999). In short, transaction costs occur through every economic exchange (e.g. products, money, and especially information, for example, search cost or through the transfer of rights of disposal). Basically, the approach to create hierarchies as well as work processes within a company can be interpreted as attempts to lower these costs by allocating every person and process step a predefined slot. Coase (1937) pointed out that the reason why companies are able to exist can be explained by the fact that the transaction costs within the organization are lower than the transaction costs on the open market. Thus, we could argue that the reason why user-generated content models were not possible (for complex products) in a pre-digital economy is due to the fact that transaction costs were prohibitively high outside of company structures.

In addition to these differences in transaction costs, user-generated content communities and commercial production also show differences regarding work processes. Commercial products are usually produced in a well-defined workflow concept where each member of the process chain has a specific role to play and a specific contribution to make (see more on this aspect in the section about quality assurance mechanisms). This aspect of division of labor, as discussed before, allows for a pre-defined and specialized contribution to the product. User-generated content communities, on the other hand, usually do not have this idea of division of labor. Even though they also often develop hierarchies, they usually do not have a central planning instance. This means that each member of the community can work on any aspect or community task he or she prefers.

A forum member may answer any question and a wiki member may contribute any article to any aspect he or she finds interesting. This might lead to the fact that the community members have a more holistic perception of what they do.

2.1.2. Property rights and individual motivation

As already pointed out, the notion of user-generated content is closely related to the concept of an online community. One could argue that from a motivational perspective the contribution of user-generated content is only possible when based on a community of users. One difference between these two concepts is the fact that in user-generated content communities the production of goods is not for someone else (i.e. a customer) but for all the members that constitute the community (including the contributors themselves).

This aspect is connected to the question of property rights (for an overview see Picot et al. 2008). Within commercial companies, the goods produced do not belong to the producers but to the owners of the company as well as, later on, to those customers that are willing and able to pay the appointed price. Within the community, the produced goods belong to all the members of the community. In concepts of the property rights theory, community members usually have the right to use a good (usus). However, they usually do not have the right or the possibility to acquire gains arising from the product or the responsibility to assume losses that result from it (usus fructus). This, on the other hand, is the traditional right of the entrepreneur who owns a commercial company. Respectively, one could describe the goods that are produced in a community as public goods since they are usually non-rival and non-excludable. In some communities, the community members have the explicit right to alter the form or substance of goods (abusus), such as in open source programming communities. These conceptual differences show that online communities, indeed, have characteristics that can be related to Karl Marx's concept of a commune where all the means of production as well as the output belongs to everybody in the commune.

Regarding individual motivation and incentives, this implies structural differences between the community production process and the industrial production process. One of the main incentives (but probably not the only one) for an industrial work setting is the money the worker receives as salary. High quality work is often rewarded with money in form of bonus payments or by promoting the person to positions with higher salaries. If money is one of the key drivers for the industrial setting, this incentive has to be replaced by something else in the community-based scenario. This aspect will be discussed in more detail in Section 2.2. Either one argues that other benefits occur (e.g. social reputation), or one argues that when working in a community-scenario people operate

under different conditions and do not need to be compensated for an active and self-determined participation in the community.

2.1.3 Selection of contributors

Finally, selection mechanisms for whom is allowed to contribute to the production of the goods are different. For industrial companies the selection process is usually based on formal education. Company representatives take degrees and references as a signal that someone is "suitable" for a certain job. Communities do not have these formal selection criteria, i.e. everybody has, on principle, the right to contribute. However, communities do have social exclusion mechanisms that can be fairly rigorous. New members that ask questions deemed below the standards of the community are ignored or these new members are asked to leave the community. Wikipedia articles that are considered to be irrelevant are deleted by other members of the community. The difference between user-generated online communities and commercial production is summarized in Table 2.1.1. However, we should be aware that these poles are extremes and that industrial organizations have elements of communities and vice versa.

Table 2.1.1: Difference between user generated communities and traditional production processes

	Community-based production process	**Traditional industrial production process**
Division of Labor and Process	All community members are on principle responsible for all activities around the production process	Well defined tasks in a process based on the concept of division of labor
Property Rights	Products belong to community members	Products belong to enterprise owner and are sold to customers
Incentives	Reputation, Self-fulfillment, Fun	Monetary rewards as one important aspect
Business Model	Products are created for own use; notion of self-sufficiency, no revenue streams from third party	Created products are sold to a third party; revenue streams from customers
Member Selection	No formal criteria, selection process can be established based on social mechanism and pressure	Based on formal education, work references and prior experience
Knowledge Management	Self-organizational, self initiated learning processes	Embedded in hierarchies and work processes

2.1.4 Comparing quality assurance mechanisms on community-based platforms with commercial production processes

The previous section already discussed many aspects that are central to the difference between online community platforms and commercial content regarding the assurance of quality. As pointed out two aspects are crucial in this regard: 1) the selection of members 2) the implementation of processes. Industrial companies invest considerable effort in finding and selecting appropriate employees. This is connected to the fact that the training of new members as well as the costs arising from a poor decision are considerably high. In this regard, companies rely on formal education, references and prior experience. Educational achievements are frequently taken as important selection criteria. It allows the aspirant to signal his or her ability and thus, the educational system plays an important role in lowering the transaction costs of finding people by allowing them to disclose hidden characteristics (cf. Wigand et al. p. 1997). Open content communities do not have these formal selection criteria and everybody can participate. However, they do have selection mechanisms that stem from socially emerging structures.

In addition to the selection process, the quality assurance mechanisms of traditional industrial organization relies strongly on work processes. Quality assurance for traditional products is centrally implemented in the production processes. These processes assure that, in a foreseeable manner, actions are taken in a spatiotemporal coordination. Each stakeholder in the process has a predefined task to perform. This process usually includes steps of checking and re-checking the products' quality within an organization but also across organizations (e.g. author -> lecture -> publisher -> printing). Accordingly, business process modeling is an intensive research field with examples like Six Sigma or the Capability Maturity Model (CMM). To illustrate, Figure 2.1.2 shows a typical example of a quality assurance process in the software industry.

User-generated content platforms, on the other hand, do not have a coordinated quality assurance process like this. The main concept that replaces these mechanisms is the idea that the community members find and correct errors after they have been published on the platform. Eric Raymond (1997/2000) has described this with the statement: "Given enough eyeballs, all bugs become shallow", which was related to the Linux project. He argued that if the number of beta-tester and co-developers is large enough, almost every problem is found and fixed quickly. This obviously requires a sufficiently large user base and, furthermore, it requires that these users feel responsible for the entire production of the platform and not only for their respective part.

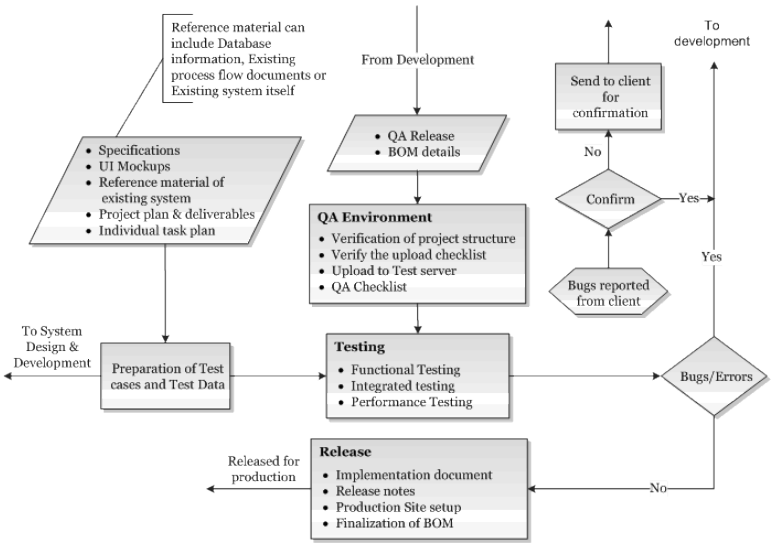

Figure 2.1.2: Example of a quality assurance process in the software industry[3]

The community process works exactly the way the industrial process is not supposed to work: when and by whom something is carried out is unpredictable. This also means a single person cannot be held accountable. Presumably, this feeling of holistic responsibility is fostered if the property rights are distributed as described as above. As public goods, everything that is produced belongs to the community and, thus, for the individual it is rewarding to improve the production of the community as a whole.

Regarding the coordination of the quality control mechanism, we do not find clearly defined processes as is the case for industrial companies. However, online communities do also develop social hierarchies that have an influence on the quality control process. In the case of Wikipedia, for example, it is known that Wikipedia authors can be selected to become editors. In this position the authors have additional rights, such as deleting other authors' entries. Table 2.1.2 summarizes the advantages and disadvantages of traditional as well as user generated content processes.

[3] http://www.iqrconsulting.com/images/QAProcess.gif

Table 2.1.2: Advantages and disadvantages of traditional and community-centered quality control

Traditional production process		**Community-based production process**	
Advantages	**Disadvantages**	**Advantages**	**Disadvantages**
Everybody knows what to do; Foreseeable mistakes or structural problems from the past can be implemented in the quality assurance process Plannable: How much man power do we need to control quality in our process? Persons can be instructed and usually are obliged to act as specified by the process Persons can be asked to document and the process is a documentation in itself Accountability of individuals for errors	Non-holistic approach: persons are only responsible for their part of the process – If the process is flawed no one might notice Structural mistakes outside the scope of the process might get missed	Everybody feels responsible for everything Community continually defines scope and quality levels Few experiences with predictability of community quality Individuals often cannot be held accountable for errors	Everybody feels responsible for everything (or nothing) If there is a problem, persons cannot be forced to solve them – reliability Diffusion of Responsibility - if the whole thing fails nobody is responsible (or the entire community)

2.2 Literature review on online travel communities: A self-determination theory approach[4]

For centuries, traveling has been an activity for recreation, socialization, knowledge acquisition and, in a more general sense, broadening of one's horizon. There has always been an adventurous aspect to it as well. The traveler voluntarily left his stable surroundings, incurred organizational efforts and was willing to accept the inconvenience of uncomfortable beds and delayed trains. Alongside the romanticism connected to traveling, there was always a vivid interest in reports about travel adventures. These popular descriptions of distant places ranged from the classical Odyssey, the famous Marco Polo diaries, to the fictitious journey of Jonathan Swift's Gulliver. While these early travel reports were mainly written to inspire the reader's fantasy, the rise of mass tourism in the past century has led to millions of voyagers who became thirsty for travel-related knowledge. The need to know about experiences and recommendations of fellow travelers has subsequently led to the inception of the widely known Lonely Planet guidebooks and then to the increased use of travel blogs, tourism forums and travel wikis that have emerged on the Internet.

In this chapter, we provide a literature review of scientific findings how online communities can support the need of travelers. We use the self-determination theory proposed by Deci & Ryan (2000) as a lens to argue the basic needs of travelers and to provide a structure for this chapter. The three innate psychological needs claimed by this theory – competence, autonomy and relatedness – are well suited to describe a traveler's motivation. This holds, in particular, for a special group of travelers – the independent traveler or so-called backpacker. This group – usually traveling on its own initiative and thus not being part of an all-inclusive group – has for a long time been recognized as persons with specific information needs. These travelers undergo knowledge-intensive planning phases, and are in a continuous need for fresh information during their dynamically changing travel situations. This, in combination with a high willingness to socialize, makes independent travelers a group that is often associated with online travel communities.

The rest of this chapter is organized as follows. We first motivate the use of self-determination theory for independent travelers and then discuss how online communities

[4] The following chapter on online travel communities was taken from a book chapter by Aschoff & Schwabe (2012). Online Travel Communities – A Self-Determination Theory Approach. Accepted for publication in Leimeister & Rajagopalan (Eds.) Virtual Communities. M.E. Sharpe: Advances in Management Information Systems (AMIS) Series. Some passages that are discussed in more detail in other parts of this thesis were omitted; slight modifications were made.

can foster a traveler's competence, autonomy and relatedness. We then switch the focus from the traveler's perspective to a business perspective, where we describe how community-based business models are developed around these three basic needs for travelers. Finally, we discuss the benefits of our perspective, based on self-determination theory, for further research, future business models and community developers.

2.2.1 An independent traveler's needs based on self-determination theory

There is an argument among experts whether backpackers should actually be regarded as a culture or a subculture of their own (cf. Paris 2009). Nevertheless, the literature has a number of characteristics attributed to this specific group of travelers, and sets it apart from other groups of tourists. Having emerged from the hippie and beat generation of the 50s and 70s in the United States, backpacking has developed more and more to a mass phenomenon over the last decades (cf. Paris 2009). Despite this development from a small sociocritical group to a widely popular movement, the following five 'pillars' are described as characteristics of the backpacker ideology (Welk 2004): 1. Travelling on a low budget, 2. Meeting different people, 3. Being (or feeling) free, independent and open minded, 4. Organizing one's journey individually and independently, and 5. Traveling as long as possible. These aspects of a backpacker's self-image show that this group has interests, as well as socializing and information needs, that differ from all-inclusive mainstream tourism.

We perceive this self-conceptualization of the backpacker traveler especially well represented by the self-determination theory proposed by Deci & Ryan (2000). This approach is rooted in motivational psychology, and provides an empirically founded theoretical framework to describe psychological needs and the influence on human behavior. At the center of their theory, the authors claim three innate psychological needs:

1. Competence
2. Autonomy
3. Relatedness

Competence refers to the aspect of successfully dealing with one's environment. For the traveler, this means having sufficient information and sufficient skills to enjoy the trip but also being able to overcome difficulties that arise from a constantly and dynamically changing environment. *Autonomy* refers to freedom of choice and being able to lead a self-determined life. This need relates to one of the most central motives of a

backpacker's self-conceptualization, i.e., to feel free and to travel individually and independently (cf. Welk 2004). It also appears to be one of the clearest differentiations to other forms of tourism which focus more on luxury and recreation by booking hotels or cruise trips beforehand for a specified time interval. In contrast to this, the backpacker seeks to maintain spontaneity over actions and also over time. This is connected to the motive of not setting a pre-specified end for a trip but 'to travel as long as possible' (ibid). *Relatedness* refers to the possibility of interacting with others. Welk points out that this includes other backpackers, as well as locals, and is part of the 'global village' idea (cf. McLuhan 1962) that he connects to the backpacker ideology. Thus, in addition to actual meetings and exchange with locals and fellow travelers, the 'inner feeling of relatedness' can be regarded as a crucial aspect of the traveler's community.

2.2.2 The online travel community: Conceptualization and member motivation

There is a long history of scientific definitions of the concept 'community' and more specifically of the concept 'online community'. For the purpose of online travel communities in this chapter, we follow the notion of Wang et al. (2002) who draw on the widely-cited criteria by Preece (2000). Preece claims *people, purpose, policy* and *computer systems* as being the central characteristics of online communities. Thus, the *people* in the case of online travel communities are fellow travelers that participate in the community, possibly holding different roles. The general *purpose* of such a community will usually be the exchange of travel-related information and the development of social bonds among travelers, whereas more specialized communities focusing on specific travel regions or specific travel-related interests, such as surfing, family travel, can exist (cf. Aschoff & Schwabe 2009). *Policies* refer to explicated or unwritten codes of conduct, and provide guidance for community member behavior and interaction patterns. *Computer systems* are the obvious requirement to differentiate between a traditional off-line community and an online community. We take a broad view on this matter considering all systems that support the traveler's feeling of belonging to a global traveling community. These systems include not only mailing lists, forums, wikis, and travel blogs, but also newer social networking sites (like e.g., Facebook). Some of these social network sites now have very active travel-related groups and are increasingly being used particularly by younger travelers (cf. Paris 2009).

In addition to these four criteria by Preece, Wang et al. (2002) differentiate between the *virtual community as place*, the *virtual community as symbol*, and the *virtual community as virtual*. The *virtual community as place* refers to the concept of space, we are used to generally attribute to traditional communities. Thus, the *virtual community as*

place refers to the location "where people can develop and maintain social and economic relationships and explore new opportunities" (ibid). In contrast to this, the *community as symbol* refers to the community as it exists in the mind and hearts of the community members. Finally, the aspect of '*virtuality*' adds more complexity and touches on the question of whether the online community really exists or not. Wang et al. (2002) find an interesting angle to this problem, pointing out that the virtual community does not seem to be real for those who are off-line and not part of it, but very real for those who are active members of it. These conceptualizations show that the core aspects of a virtual travel community cannot easily be defined; at least, simply referring to a technological platform as a 'community' would fail to do justice to the concept. The community, rather, is constructed in the minds of the members of this platform, again showing the relation to the concept of 'relatedness.' Accordingly, Ryan et al. (2010) point out that relatedness is something "beyond simply being around other people." It is more a basic psychological need for feeling close and connected to others.

In subsequent research, Wang & Fesenmaier (2004) have proposed a comprehensive model of participation benefits and contribution incentives for online travel communities. The participation benefits include *functional benefits* such as transactions in which travelers buy and sell products or services, as well as the support for information gathering or for decision making purposes. *Social benefits* refer to help and support, the exchange of ideas and the forming of relationships. *Psychological benefits* are targeted more to the inner world of the traveler, referring to a sense of belonging, identity expression or a sense of affiliation with others. Finally, *hedonic benefits* refer to enjoyment and entertainment purposes.

From another view, the authors claim a number of contribution incentives such as *instrumental incentives*, *efficacy incentives*, *quality assurance incentives*, *incentives of gaining status,* and *expectancy incentives*. The proposed model of their study was tested with members of a virtual travel community operated by a large US-based travel company. The results showed that *social* and *hedonic benefits* had a significantly positive correlation with the level of community involvement, whereas *psychological benefits* did not turn out to be significant; further, *functional benefits* turned out to be negatively correlated with involvement. Regarding the contribution incentives, it was *instrumental, efficacy*, and *expectancy* that were significantly related to the level of contribution, whereas *quality control* and *gaining status* was not. The authors concluded that community members spend more time with *hedonic* aspects or *social* exchange rather than with functional aspects. They argued that *psychological benefits* do not seem to be crucial for the particular community of their study, but they might be more central for

communities where affiliation and affection are still more important, such as communities for certain diseases. *Efficacy* (e.g., being helpful, satisfying other people's needs) turned out to be most strongly related to user contribution, indicating again the strong social aspects of online travel communities.

By drawing on self-determination theory, we do not seek to contradict findings by Wang and Fesenmaier. Self-determination theory is rooted in psychology and has thus not been developed by online community research. By using this broader theoretical approach, we intend to take a wider perspective and seek to complement our understanding of independent travelers as they interact with travel communities. Thus, in subsequent sections we seek to explain how online communities can foster the traveler's competence, autonomy and relatedness.

2.2.3 Community-based support of the traveler's three innate needs

Community-based support of a traveler's competence

Competence refers to successfully dealing with one's environment, a challenge especially provoking for the traveler due to the fact that she lacks many resources she normally can rely on at home (like personal computer, refrigerator, book collections etc.) Additionally, she has only limited knowledge of her environment - an environment that may change on a daily base. We see Wang & Fesenmaier's *functional benefits* in line with this. These functional benefits include "transactions in which members buy and sell products or services (..), support for information gathering and seeking for both learning and facilitating decision-making purposes, as well as the convenience or efficiency the virtual travel community provides to its members where information can be accessed without concerns about time and geographical limits." In the following sections we highlight how travel communities can support the information gathering and decision-making process, and how online communities can support the purchasing process when it comes to buying travel-related products.

Information gathering and supporting decision-making. The backpacker ideology of traveling individually, independently and on a low budget leads to complex and dynamically changing information needs. To be self-reliant requires the traveler to have sufficient information to cope with travel-related challenges and to find accommodation and restaurants with moderate prices. Thus, the traveler's information needs can be very open and complex. Consider, for example, this authentic posting taken from an online travel forum: *"I have only two weeks left in my trip to explore Ecuador, (...). I have Riobamba and Baños left on my list between here (...) and Quito, and that puts me into*

Quito with at least 6 days to kill there. (...), I'm considering a few days over at Bahia de Caraquez. How long is the bus ride? How are the beaches? And, overall, is it worth it to go there? Thanks!"[5] The examples shows that the information needs of an independent traveler range from factual questions ("How long is the bus ride?") to open questions that seek advice and judgment ("..is it worth going there?").

For this kind of information need, the online forum offers considerable advantages compared to other information sources, such as printed guidebooks or key-word based search engines that are widely used to query the Web. First, the online forum offers members the possibility to ask natural questions, thereby, enabling them to fully express their information need. Thus, they can ask questions that are very specific to their individual travel situation. Furthermore, other community members are able to help to refine a previously fuzzy information need. This advantage is emphasized by research that shows that users have difficulty adequately expressing their information need using a key-word based search engine and even deteriorate their search results by an erroneous use of Boolean operators (Jansen et al. 2000).

The described research on quality in online communities focused on the aspect of information itself, assuming that better information quality would lead to better travel quality (cf. Schwabe & Prestipino 2005). Arsal et al. (2008) illuminate this connection by researching how an online travel community influences travel decisions during the planning phase. They selected forum posts that clearly indicated that the poster would consider recommendations from the forum for travel plans. The results showed that the influence varied for two distinctive groups: 1) residents were more influential for on-site travel decisions like food and beverage recommendations, safety concern and travel itinerary modifications; and 2) experienced travelers, on the other hand, influenced general travel related issues such as accommodation, transportation, monetary issues or tourism-related problems that a traveler could encounter at a specific site.

Buying products and supporting purchasing decisions. Early online communities, such as the WELL described by Rheingold (1993), were characterized by an interaction outside of the capitalistic off-line world. Members were empathic and helped each other without any monetary incentives. With the rise of the Internet to a mass medium, however, online communities were increasingly targeted by economic interests. Most of today's online travel communities can be described as interwoven socio-economic spheres. Members

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http://www.lonelyplanet.com/thorntree/forum.jspa?forumID=22

use these platforms to socialize and exchange knowledge, but, at the same time, advertisement is published and travel products are offered that can be purchased. Vendors, of course, hope for the community as a promising sales market, and have high expectations that the loyalty of the members to their community will also lead to long-term loyalty to their products. Indeed, Kim et al. (2004) find a small but significant correlation between loyalty to the community and executed travel product purchases, while Wu and Chang (2005) point to the importance of a flow experience of travel community members to increase their transaction intensions.

While the purchase of products in online communities is widely regarded as a promising business model (cf. Hagel & Armstrong 1997), virtual communities do also have a considerable impact on purchase decisions outside the community. Travel products are largely service products (e.g., sightseeing tours, hotel accommodations, restaurant visits, etc.). Thus, these products are 'experience' goods in that they are experienced during consumption but not before.

This leads to an information asymmetry or quality uncertainty. The traveler, especially when planning his trip online, has no clear indication about the quality of the product she is about to purchase. This need leads to the popularity of product reviews by fellow travelers often in the form of ratings or comments on respective review sites (a phenomenon also referred to as electronic word-of-mouth eWOM). From the perspective of the traveler, these reviews have the advantage that they are written by travelers who have previously experienced the product, thus lowering the described information asymmetry. In addition, it can be assumed that reviews from fellow travelers are perceived to be more trustworthy than descriptions or pictures provided by the hotels themselves.

The above leads to an increased competence in distinguishing useful travel products from non-useful products for the traveler. In this regard, Sidali et al. (2009) showed that test participants preferred reviews by other travelers over other sources of information such as hotel ratings, travel guides or recommendations of travel agents. The study also revealed that over 60% of the trust in these reviews was explained by the perceived expertness of the reviews, credibility of the platform and brand familiarity. Finally, a significant and positive influence of these reviews on the choice of accommodations was demonstrated. These results are in line with Ye et al. (2009) who showed a significant relationship between online consumer reviews and business performance of hotels.

Thus, we illustrated how online travel communities can increase travel competence. Communities can provide high quality information to support travel

decisions regarding the choice of travel destination or appropriate behavior in foreign countries. In addition, community-based reviews of fellow travelers allow for better discrimination between tourism-related products. We do, however, also find considerable variance in the travel community landscape that ranges from very helpful communities to less useful ones. Today, the traveler lacks orientation where to find the most useful and reliable community-based information, and further research should provide more guidance for the traveler in this regard.

Community-based support of a traveler's autonomy

Autonomy can be considered as one of the most central aspects of the backpacker ideology. In this context, autonomy suggests being able to individually and independently travel to any chosen destination and to be free and spontaneous while doing so, i.e., to be in charge of one's time. This is also an aspect that sets traveling apart from the everyday working routine; in line with this, Ryan et al. (2010) show that the feeling of autonomy is stronger during weekends.

In previous sections, we pointed to a community member's possibility of asking open and complex question, thereby, tapping into the rich experience base of fellow community members. Thus, an active community with a large member base should be able to provide travelers with information specifically tailored to individual travel situations. In line with this reasoning, Schwabe and Prestipino (2005) argue that online travel communities should, in principle, be able to provide more personalized information than do printed guidebooks. The community is able to respond to current individual information needs, while the guidebook is always a compromise of the assumed information needs of prospective readers. This aspect increases the autonomy of travelers because they are able to obtain information (e.g., about remote travel destinations) that is not published in printed guidebooks, which increases the radius of their travel plans.

This aspect of increased autonomy through increased individualization of information goes hand in hand with another aspect of autonomy that is enhanced by the community: the freedom to provide information and opinions. In this regard, the travel guide industry is a mirror of the changing history of today's mass media. Formerly, the communication channel between information providers and information consumers was mostly a one-way street. The traveler depended on the information provided by travel agencies or printed guidebooks. This situation has been considerably changed by the so-called Social Web or the Web 2.0 phenomenon (O'Reilly 2005, O'Reilly 2007). It has turned the Web into a social sphere and given travelers the possibility to expressing themselves using forum postings, wikis, travel-blogs or the described travel product

reviews. In this way, the traveler is able to engage in a dialogue with fellow travelers, thus, actively and independently forming the knowledge about travel-related aspects rather than passively consuming it.

Furthermore, as Aschoff and Schwabe (2009) point out, the traveler not only has an increased autonomy respecting the information she can obtain or publish, but she also has increased autonomy regarding the social community which she would like to become a part of. Traditional off-line communities (such as neighborhoods or religious backgrounds) were rather a matter of fate than choice; compared to this, members can now change their online communities with negligible effort. While the effect on this freedom can have debatable consequences for the social cohesion of online communities and provide an interesting research question, the virtualization of the community concept surely provides more autonomy and more freedom of choice for online community members.

We have already pointed out that increased personalized information leads to a higher autonomy because it increases the options for travelers. This tendency is taken to the next level by a concept that has recently gained considerable research attention: the mobile community (cf. Fremuth & Tasch 2002; Koch et al. 2002; Schwabe & Prestipino 2005; Aschoff & Novak 2008b). Research shows that despite all the research interest and assumed advantages claimed for online communities, travelers still use traditional printed travel guides as one of the predominant sources for travel information (Hofstaetter & Egger 2009; Prestipino 2006). We believe that this preference can, to some extent, be explained by the fact that guidebooks can easily be taken along to any point of interest, while the traditional PC-based online community cannot. This advantage of the guidebook, however, may now increasingly vanish, with the traveling community increasingly being supported by mobile technology.

Traveler autonomy is closely related to spontaneity. This means not to be restricted by pre-specified plans but to be able to make decisions on the spur of the moment, according to possibilities or adversities that can arise at any time during a journey. This capability is decisively increased by the mobile community setting, which is characterized by location awareness, ubiquity, identification, and immediacy (Prykop & Heitmann 2006). Thus, the traveler does not have to carry out comprehensive research about travel facts during the planning phase and then have to rely on this information, but she can adapt much more to a dynamically changing environment (including weather conditions, unscheduled but attractive events or just short-term moods). The mobile community is suited to these kinds of events, especially because of the potential of location-based services (Hillebrand and Baumgarten 2005), and also shows considerable

new options for our next dimension, i.e., relatedness. The mobile community allows building a spontaneous group of like-minded travelers for common activities such as hiking or renting a car or a boat (for the important aspects of match making in mobile community scenarios see Reichwald & Ney 2005 and Burak & Sharon 2004).

Community-based support of a traveler's relatedness

Being related to others can be regarded as one of the oldest motives for developing communities in the first place. Accordingly, aspects of social involvement are repeatedly discussed as one of the dominant motives to become part of online communities (Ridings & Gefen 2004). Wang and Fesenmaier (2004) make the distinction between social benefits and psychological benefits. Social benefits are more concrete benefits referring to social relationships and the benefits of social exchange, whereas psychological benefits are more related to the inner representation of the community ('feeling connected').

These social and psychological aspects are also related to contribution incentives. One possible motivating factor in this regard is the expectancy of reciprocity, i.e., advice about a travel destination will sometimes later on be rewarded by another community member. (Ekeh 1974 calls this mechanism 'generalized exchange' - meaning that not just the individual, but the community as a whole rewards one's contribution.) Another motive that is associated with relatedness is the gaining of social status. Providing helpful insights for other travelers can create respect and gratitude. This again can lead to a high sense of self-efficacy (Bandura 1995) and the feeling that someone has an impact or even power within the traveler community.

The case of (online) travel communities shows that the sharp contrast sometimes stressed between off-line communities and virtual communities often does not provide an accurate picture of the actual social construction. While there might be shifting degrees of virtualization in different communities, most communities will be a 'real life' community as well as an online community, and not one or the other. Thus, travelers form an off-line community by traveling together and meeting one other as well as by socializing and exchanging information over the Internet. In this regard, Paris (2009) argues that the virtualization of the backpacker culture (i.e., backpackers joining in virtual communities) has actually allowed backpackers to fulfill, to a greater extent, the five pillars of backpacking, as proposed by Welk (2004).

The fascination of social bonds that might develop in a mere virtual environment has often suppressed another relevant question: What can online social interactions do for off-line community bonds? That this perspective is important but sometimes neglected by online community researchers is also supported by findings indicating that Facebook

members use the social network to stay in touch with off-line friends rather than finding new online friends (Ellison et al. 2007). Paris (2009) shows that while people of medium age prefer to use forums, younger backpackers increasingly use social networking sites such as Facebook (also see Köbler et al. 2010 for research on the social connectedness on Facebook). In this tendency, we see the need to be related to others that is satisfied in a more direct way, as compared to that on the decades older forum sites.

Finally, mobile communities allow travelers to be individual and independent, but, at the same, they can be constantly connected to the travel community. Aschoff & Novak (2008a) have coined the term, 'mobile campfire' for this situation, arguing that mobile devices would – in a social sense – be like a campfire that the traveler can always carry with him. Wherever he or she goes, the possibility exists to 'light this fire' and to benefit from the information that is exchanged in this situation, but also from the feeling of social belonging that is associated with the archetypical campfire situation.

2.2.4 A business perspective on online travel communities

We already cited Rheingold's (1993) description of the WELL, a community that evolved in the San Francisco Bay area in the early 80s. The focus of this author was more on the fascination of social bonds that developed in a merely virtual sphere. Rheingold vividly described how the members of the community would support each other without any monetary incentives and even comfort one other, e.g., in the case of a sick child. This, from an idealistic viewpoint, describes a scenario in which members of an online community meet one another in a world where – at least at the beginning – everybody is equal. Social status and possessions in the off-line world do not influence the relationship building, and the social status that emerges is merely based on the contribution to the community. While this situation might still be true from the individual member perspective, online communities have steered increasing economic interests due to the rise of the Internet to a mass market (e.g., cf. Hagel & Armstrong 1997).

The business perspective that we now turn our attention to requires discussing aspects of a business model. For this, we draw on the business model components, proposed by Osterwalder (2004). In short, Osterwalder distinguishes between the infrastructure management, the offered product, the customer interface and the financial aspects. Internet-based business models have some peculiarities compared to traditional business models. For example, the acquired revenue stream is often not based on the main value proposition or on the largest user or customer group (for example, the case of Google: Google's main value proposition is search results but the generated revenue does not come from users of the search engine but from advertisers). We would argue that

similar characteristics hold for online communities. The main value proposition is information exchange and socializing benefits, and these assets are provided by the same persons that are also the main customers: the community members. This kind of value proposition has been discussed in the previous sections where we described how communities support the three innate needs of travelers.

For the remaining sections of this chapter, we would like to turn our attention to the financial component of Osterwalder's business model, more concretely to the aspect of how online travel communities are able to generate revenue streams. We will continue to use the three introduced needs dimensions and describe how business models can be constructed, based on traveler competence, autonomy and relatedness.

Community-related business models based on a traveler's competence

Since the inception of this Web 2.0 phenomenon around 2000, users have contributed increasingly valuable information to the Web, with the Wikipedia encyclopedia as the most famous example. This valuable user-generated information can be collected by community operators and can be used to generate revenue streams by refining the information and providing it to third parties with special interests. In the case of the tourism market, this third party will often be persons active in the gastronomy business such as owners of hotels or restaurants who are interested in customer feedback. Platform operators who collect a vast number of travel reviews on their site can now refine and customize this information for single hotels and offer it as an information service.

A step further in this direction of information refinement is undertaken by www.trustyou.com. This site aggregates user reviews from numerous tourism reviews sites, and then offers this information to tourist destinations and the gastronomy. A different approach to content aggregation is proposed by Crandall et al. (2009). An analysis of geotagged photos on the photo sharing site 'flickr' reveals what people like to take pictures of. The most frequently photographed sites are tourist attractions. Thus, they can automatically and dynamically create a ranked list of currently popular tourist attractions.

Another possibility to tap into the collective competence of the community emerges if a company sells information-intensive travel-products such as printed guidebooks. An example of this business benefit is the Thorn Tree community run by the Lonely Planet Publishing Company. This active community has the advantage that information about newly published guidebooks can easily be spread in the travel community benefiting from the broad communication channel the community provides for the company. Thus, the company can use the community to inform community

members about new products. In addition to this, the community is a valuable information source for the company as well. By being part of the information exchange among community members, a publisher of travel guides could be well informed of the current most popular travel destinations, and can track trends to predict future destinations and travel behaviors, thus benefiting from this information for the re-issuing of their printed guidebooks (see Stockdale & Borovicka 2006 for a case study of the Lonely Planet online community).

This aspect of tapping into user competence to cause additional value creation has recently been discussed under the term co-creation (Payne et al. 2008) or 'Co-opting Customer Competence,' as Prahalad and Ramaswamy (2000) phrase it. The authors describe how a company's competition can be increased by harnessing the user competences. As examples, they describe test-users for the Microsoft's Windows 2000 product or Cisco's approach to provide a platform where users can help each other when experiencing problems with Cisco's products. Prahald and Ramaswamy point out that fostering customer communities is one of the key strategic aspects of the co-creation approach. Binkhorst (2006) suggests that the idea of co-creation, even though it shows potential for the travel industry, is still hardly exploited, compared to other industries, and proposes a research agenda to this end. Similarly, Payne et al. (2008) use travel planning as an example to illustrate the potential of the co-creation approach.

Community-related business models based on a traveler's autonomy

Human need for individual autonomy has been the driver for many successful inventions in history such as the book, the car or the mobile phone. The Internet can also be seen in this tradition. It increased people's autonomy with reference to time and location. Activities such as shopping, learning or entertainment can be done at any time and at any place with an Internet connection. The disintermediation of traditional supply chains by the Internet is in essence due to the human need to autonomously decide when and where to purchase products.

As we have pointed out, the concept that allows this kind of autonomy, to a high degree, is that of a mobile community. However, while the concept was discussed for some years within the scientific communities (e.g., Leimeister et al. 2003), and some prototypes were launched by the industry, the concept did not take off for quite some time. We would argue that this is currently changing with the success of twitter.com, where members can keep in touch with one other by writing short messages of up to 140 characters (micro blogging). This development that is in line with Aschoff & Novak's (2008b) argument, namely, that widespread mobile community usage will presumably

not be based on sophisticated high-end PDA or Smartphone technology (e.g., complicated social matching services) but rather on approaches that make the community easily accessible to users within an everyday context. Regarding revenue streams, Twitter has just recently announced an ad-supported business model[6] by adding 'promoted' tweets into the stream of user-generated tweets. Twitter is cautious and tries to introduce these tweets as unobtrusively as possible, but the future will have to show how the Twitter community responds to this business model approach.

Additional business models have, for example, been suggested by Schubert & Hampe (2006). These authors propose a business model for a fitness-center. The advantage of this approach for customers is the possibility via buddy-lists to spontaneously organize their leisure activities (e.g., finding a partner for a squash match), whereas the mobile devices, at the same time, are booking devices (e.g., for the squash court.) As a revenue model, the authors propose subscription fees be paid by members to the leisure service providers, whereas other stakeholders such as sports shop or restaurants finance their participation by indirect benefits from increased sales, better customer service, etc.

In a similar way, Prykop and Heitmann (2006) point to the big potential of mobile communities for branding purposes. According to the authors, this potential is especially due to the following characteristics of the mobile community: location awareness, ubiquity, identification, and immediacy. This potential can especially be exploited by the travel sector. It would enable companies to provide communities with targeted ads based on location and time (cf. Hampe & Schwabe 2002) (e.g., the recommendation of a restaurant that is located in the area the traveler comes through) or interest profile (opportunities for a sailing trip for a person who has been identified as someone with an interest in water sports.)

Community-related business model based on a traveler's relatedness

Next to satisfying information needs, getting connected to others is one of the predominant motives of people to join a community (Ridings & Gefen 2004). From a business perspective, online communities can be regarded as entities that realize considerable network effects (cf. Aschoff & Schwabe 2009). The value of the network increases when more travelers are actively socializing on this network (cf. Shapiro & Varian 1999). Once a certain threshold is reached the community operator can realize immense demand-side economies of scale (e.g., Facebook or Twitter). This effect is also

[6] http://www.wired.com/epicenter/2010/04/twitter-unveils-ad-supported-business-model/

the reason why most communities abstain from using a business model based on members' fees. The common strategy (if the community can be said to have a strategy) is follow-the-free (cf. Zerdick et al. 2001), i.e., to get big first, and then somehow cash in later. Thus, the operator of a community or a social network can acquire huge visitor groups, whereas she does not have to offer much. Basically, the only thing she has to provide is a social meeting room that is filled by the human need to be related to others.

Drawing on the relatedness among customers to increase the relatedness to a business brand is one of the oldest business models associated with online communities (Hagel & Armstrong 1997). When a continually active social community can be created, travelers will return to this community to socialize, and this will lead to a community identity. From a business perspective, the goal is to then link this identity to a certain brand. From the perspective of the brand owner, this leads to high socially-induced switching costs for the members and thus to higher customer retention.

A different follow-up strategy based on the network effect of the need for relatedness is selling the attention and purchasing power of this emerged community to others. One of the most common strategies used on the Internet is advertisement (e.g., provision for click rates) or allowing others to offer products on one's community and taking provision for this. There are, in principle, two options to accomplish this: A kind of forward integration toward the transaction when a running community starts to offer products as well, or a kind of backward integration towards marketing and brand building when an online offerer of products tries to install a community on its online-shop.

In addition, the community operator has the very valuable knowledge of who is related to whom. Marketing research of social networks shows that the relationship between two customers is one of the best predictors of the purchase of products. This means that if a traveler is buying a product, it is very likely that other persons to whom he or she is linked will also buy this product. Hill et al. (2006) showed that 'network neighbors' – someone who is linked to a prior customer – adopted a specific service 3-5 time greater than baseline groups that were selected by the best practice of the firms marketing team. If the community is embedded in a social network, such as Facebook, far more detailed information on member preferences can be mined and used for targeted advertisements.

2.2.5 Conclusion

By drawing on self-determination theory proposed by Deci & Ryan (2000), we have provided a comprehensive perspective on a backpacker's needs and how these needs are supported by travel communities. We believe that it adds an important perspective to the

existing views on online community behavior that dominate current information system research. Even though this is not always made explicit, we would argue that many approaches on community member motivation in the information systems field are based on the underlying assumption of the homo economicus. The "homo economicus" is a model of the nature of man that is sometimes (critically) identified in economic research. A somewhat simplistic understanding of this concept can be established based on a quote by John Stuart Mill (1836) who states that political economy is concerned with a man solely as a being "who desires to possess wealth, and who is capable of judging the comparative efficacy of means for obtaining that end" (however see Persky 1995 for a more elaborate discussion of the concept). In its simple form, the homo economicus concept is based on the assumption hat the basic drive underlying all actions of community members is self-interest in a narrow sense, and is motivated by the maximization of personal (materialistic) benefits. We think that this conceptualization has considerable influence on the way research questions are formulated and community development strategies are developed: If the homo economicus assumption is the underlying premise, research has to answer the question of why members contribute to (online) communities *despite* their human nature. There are, of course, many answers as to how community participation *compensates* for the fact that contribution is not rewarded by financial incentives (e.g., an increase of social status and power, the expectation that support by other members will come in return, or an increased feeling of self-efficacy).

The self-determination theory, on the other hand, is not based on the homo economicus assumption, but is rooted in a more humanistic conceptualization of human nature. This assumes that persons are driven by the innate motivation to lead a self-determined life, and that competence, autonomy, and relatedness are basic motives of human actions. Consequently, when online community participation is viewed from this perspective, the question of reasons for this behavior can be answered: *because* of their innate human nature, rather than *despite* their innate human nature.

We believe that this change of perspectives can have implications for future conceptualizations of online communities. The incentives for community member participation, for example, would be different ones. It makes a difference whether a community administrators assumes that a community member has to be compensated for the fact that she does not receive money or whether the member should mainly be supported in her basic human need to get related to others. Thus, we believe that the conceptualization of self-determination is an important additional perspective if we want

to completely understand online community behavior and develop reliable strategies for online community development.

III) RELATED LITERATURE: RESEARCH APPROACHES RELATED TO OUR CONCEPT OF DISCOURSE QUALITY[7]

In the introduction, we motivated a discourse-oriented perspective instead of a document-centered one. We argued this to be a fruitful perspective for measuring the usefulness of online communities as well as for a new perspectives on Web Information Retrieval. In this section, we will describe the literature that is related to our approach from different scientific fields. We will summarize the main contributions of these fields and will explicate the research gap. This section will cover literature on discourse quality, data and information quality as well as research on Question & Answer (Q&A) sites.

Discourse and discourse quality

The word "discourse" stems from Latin "discursus" meaning "running around" or "moving back and forth". As a first orientation, we take the Oxford Dictionaries' definition claiming "discourse" to be "written or spoken communication or debate". We would further characterize the process of a discourse as an exchange of statements among two or more participants.

The concept of "discourse" has intensely been discussed by philosophical as well as linguistic researchers. One of the main authors in this regard has been Habermas (e.g. 1991, 1992) with his work on discourse ethics. While a comprehensive coverage of this topic would go beyond the scope of this thesis, we will give a short synopsis on what discourse quality means based on the works of discourse ethics. Based on Habermas as well as other authors, Steenbergen et al. (2003) formulate the following criteria for a discourse of high quality:

1. *Open participation* – every competent individual should be free to take part in the discourse whereas rules and procedure of the discourse should also be open for discussion
2. *Justification of assertions and validity claims* – i.e. "the orderly exchange of information and reasons between parties (Habermas 1991, p.370)
3. *Consideration of the common good* - a sense of empathy, other-directedness, or solidarity that allows the participants to consider the well-being of others and of the community at large

[7] Part of the literature that is summarized here, was also summarized in the „Related Literature" sections of the publications listed on page 15-17

4. *Respect* –including respect toward the group, respect for demands under discussion as well as respect towards counterarguments
5. *Constructive behavior* - Aiming to arrive at a rationally motivated consensus
6. *Authenticity* – the absence of deception in expressing intentions

These theoretical foundations of a good discourse quality could hold for every discourse and Steenberg et al. (2003) use them in the context of political deliberation. Based on these foundations, the authors develop a coding schema to analyze political debates. Thus, this discourse quality index was developed for a discourse unrelated to the discourse in computer-mediated communities and can, thus, not directly be applied to an online community context. Nevertheless, we will take the explicated theoretical foundations as an orientation for the development especially of our internal discourse framework proposed in Section 4.3.

For computer-mediated communities we draw on the definition by Herring (2001): *Computer-mediated discourse is the communication produced when human beings interact with one another by transmitting messages via networked computers.* Online community-related discourse has a number of peculiarities that distinguishes it from off-line discourse as for example in political debates. Off-line discourse analysis can assume that some exchange of statements is on principle taking place (regardless of the fact whether the quality is judged as high or low). For online communities, however, we argue that an exchange of statements, i.e. a reply to a posted message, is not self-evident. In a number of online communities, the member activity level could be so low that a reply to a posted comment is unlikely. Therefore, we will include measures such as the reply probability, the total number of replies as well as the waiting time for a first reply in our discourse quality framework. In addition, we have to be aware that online discourse behavior can considerably differ from off-line discourse behavior due to anonymity as well as the limited communication channels that are provided by text-based interfaces.

Regarding methodological approaches of analyzing discourse and especially written discourse numerous content analysis approaches have been proposed. The level of empathy, for example, has been researched, especially in health communities (e.g. Preece & Ghozati 2001; Burnett & Buerkle 2004). In addition to this, learning communities in the educational sector have been the focus of content analysis studies and frameworks. Central in this area is the analytical framework developed by Henri (1992). It comprises five dimensions of the learning process exteriorized in messages: participative, social, interactive, cognitive and metacognitive, that are further divided into subcategories. This model was used as basis for many studies (Gunawardena, Anderson,

& Lowe, 1997; Hara, Bonk & Angeli, 2000; see also Rourke, Anderson, Garrison & Archer, 1999), mostly criticized, modified or discarded (De Wever et al., 2006). However none of these category systems to research the forum discourse have been developed to systematically compare the usefulness between forums. They were not conceptualized to discriminate between more useful or less useful forums from a user perspective.

Data and information quality research

The computerization of our work as well as private life has led to immense amounts of data that is exchanged everyday and to a dependency on this data that is continuously growing. This aspect has fueled the interest of researchers and practitioners to deal with the aspect of data quality because it can have crucial impact on work processes, security relevant issues and on a company's revenue streams. At the beginning of this research field, researcher proposed numerous intuitive attributes of data quality, while a concise definition of the concept of data quality was still lacking (cf. Madnick et al. 2009). In 1996, Wang and Strong proposed a widely received conceptualization by defining "data quality" as *data that are fit for use by data consumers.* Thus, Wang & Strong took the perspective of data consumers rather than the one of IS professionals and also pointed out that data quality must be considered within the context of the task at hand. We agree with this "fitness for use" approach and will take it as an orientation for the conceptualization of our discourse quality framework. Regarding the general definition of the concept, there does not seem to be a generally agreed distinction between data quality and information quality. Batini et al. 2009 seem to use the term "data" for structured data, while referring to semi-structured and unstructured data as "information". Madnick et al. 2009 see a tendency that *data quality* refers to technical issues while *information quality* refers to nontechnical issues but the authors do not follow this distinction and use the term data quality to "refer to the full range of issues."

The information quality research field has produced numerous lists of quality attributes. Table 3.1 shows one of these lists that were taken from Kahn et al. 2002 (see also Lee et al. 2002 for a comprehensive overview of information quality dimensions and frameworks). In their literature review of the information quality field, Batini et al. 2009 conclude that there is a basic set of data quality dimensions that are focussed on by the majority of researchers. This basic set includes *accuracy, completeness, consistency and timeliness.* We take this basic set as an orientation and seek to include these basic dimensions in our framework for discourse quality as well.

While these kind of lists of information quality attributes where important to grasp the concept of information quality, they also have a number of weaknesses. Many

of these lists originated from the researchers' intuition regarding relevant dimension of information quality whereas the single dimension often remained poorly defined.

Dimensions	Definitions
Accessibility	the extent to which information is available, or easily and quickly retrievable
Appropriate Amount of Information	the extent to which the volume of information is appropriate for the task at hand
Believability	the extent to which information is regarded as true and credible
Completeness	the extent to which information is not missing and is of sufficient breadth and depth for the task at hand
Concise Representation	the extent to which information is compactly represented
Consistent Representation	the extent to which information is presented in the same format
Ease of Manipulation	the extent to which information is easy to manipulate and apply to different tasks
Free-of-Error	the extent to which information is correct and reliable
Interpretability	the extent to which information is in appropriate languages, symbols, and units, and the definitions are clear
Objectivity	the extent to which information is unbiased, unprejudiced, and impartial
Relevancy	the extent to which information is applicable and helpful for the task at hand
Reputation	the extent to which information is highly regarded in terms of its source or content
Security	the extent to which access to information is restricted appropriately to maintain its security
Timeliness	the extent to which the information is sufficiently up-to-date for the task at hand
Understandability	the extent to which information is easily comprehended
Value-Added	the extent to which information is beneficial and provides advantages from its use

Table 3.1: A list of information quality attributes taken from Kahn et al. 2002

The description of the quality dimension were often underspecified leaving it to other researchers or the practitioner to interpret how the dimension could be understood in a specific context. Gackowski 2004 reviewed popular Management Information Systems textbooks regarding their list of information quality dimensions and critically concluded: "There is no agreement among the authors either on the level of their importance, or on the sequence of their consideration, or on the completeness of the list of attributes of data/information quality". In addition to this, these approaches usually do not specify how these quality dimensions are to be measured in any concrete empirical context. We argue that there is still no widely accepted information quality framework. This aspect impedes a common understanding of information quality attributes by researchers and practitioners, hampers future theoretical considerations and causes a lack of well accepted benchmark values that can be used to systematically compare different information

systems (see Lee et al. 2002 for a promising exception). In addition to this, Burgess et al. (2004) argues that the producer perspective dominates the research on information quality and that the user perspective neglected.

For these reasons we decided to focus on few central quality dimensions for our discourse quality framework that can be connected to the main dimensions as reported by Madnick (2009). We will conceptualize these dimensions and show how they can be empirically measured. We take a user perspective and demonstrate the development of tools that can be used to guide Web user to a high-discourse quality.

Information quality research in online communities

Regarding information quality research in online communities, little research has been published for large open online communities. For small communities Neus (2001) observes that the issue of information quality is either ignored altogether, over-controlled, meaning that every message has to be approved, or is buried inside unwieldy tools that are, for example, designed for information storage but not for communication. Schwabe & Prestipino (2005) developed one of the few frameworks to measure information quality in communities that are based on different support technology (e.g. forum community, wiki community, mobile applications etc.). The authors conceptualized online communities as information systems (also cf. Prestipino & Schwabe 2005) in which information quality should be measured empirically. In their framework they proposed four factors of information quality: timeliness, completeness, structure and personalization. These approaches made important contributions as to how information quality could empirically be measured. However, only part of the variables of the framework in Schwabe & Prestipino (2005) were operationalized and empirically used. In addition, a theoretical contribution to understand the factors that influence information quality in online communities and cause the empirically observed variations is still lacking. Finally, we would criticize the conceptualization of online communities as information systems as too simplistic.

Empirical evidence on the comparison of community-based production models and commercial production models

Up-to-now there are few systematic accounts that compared user-generated content with commercial products (for open source software see Aberdour 2007). Regarding encyclopaedic content, a widely received study by Giles (2005) exists who could show that Wikipedia is on a similar quality level as the Encyclopedia Britannica. The study was not done very systematically and was, therefore, criticized by the editors of the

Encyclopedia Britannica. Besides the discussion about methodological issues, the dispute also shows that reputation and economic interest also play an important role when it comes to the assessment of the delivered information quality. Even though online forum communities are used already much longer than the Wikipedia platform and information exchange is one of the most important factors for the user (Ridings & Gefen 2004), a systematic comparison of forum information quality and commercial content has hardly taken place, yet (for an exception see Prestipino & Schwabe 2005 and Schwabe & Prestipino 2005 who report first results in this direction).

Research on Question & Answer (Q&A) sites

Another line of research that is concerned with the information or message quality on user generated content sites is the analysis of Question & Answer (Q&A) sites that have recently emerged on the Web (e.g. Adamic et al. 2008). This research mainly circles around possibilities to predict good answers on these websites. Agichtein et al. 2008, for example, lists the 20 most significant features for answer quality. Their analysis shows that "answer length" dominate other feature which are, for example, the "unique number of words" in the answer or the ratio of "thumbs up" and "thumbs down" that were given to this answer by site members. We would argue that these Q&A sites have a somewhat limited communication scenario since they focus only on the satisfaction of information needs. Furthermore, while the investigation of surface characteristics like the relationship between the length of an answer and its quality is useful in many contexts, it does not provide a deeper theoretical understanding of how this answer quality evolves.

Conclusion

To sum up, a consistent framework that conceptualizes discourse quality in online communities has not been proposed. We argue that the discourse quality is a central characteristic of online communities. We believe that the lack of such a framework hampers the further understanding as well as the future theorizing about online communities and keeps us from exploiting the full potential Web user could have in a multiple community environment.

IV) A FRAMEWORK FOR DISCOURSE QUALITY IN ONLINE COMMUNITIES

We would like to conceptualize the discourse in an online community. By discourse we mean the utterances that are exchanged among the persons of the community which usually appear in text form on community platforms. We seek to measure the discourse quality rather than the information quality since we argue that in online communities it is not only information that is exchanged. Our discourse quality framework has two levels I) A quality level that assess the relationship between the information in the online community and the respective objects this information refers to in the "external world". This quality level targets two aspects: a) whether the information a community member retrieves from the community is complete and b) whether the retrieved information is timely or correct. II) The second level refers to the internal discourse quality. This level targets the question how successful the discourse is from an internal community perspective. This perspective includes aspects like the probability to receive an answer as well as the communicational quality of this answer. The framework is consistently developed from the perspective of a community member that engages in a discourse with other community members. Figure 4.1 shows these basic elements of the measuring framework.

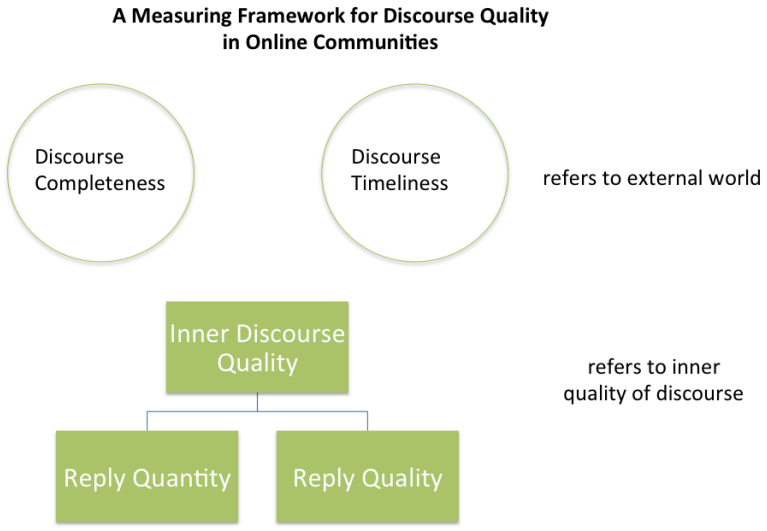

Figure 4.1: A framework for discourse quality in online communities

This measuring framework is inspired by the quality dimensions that were proposed by Schwabe and Prestipino (2005) for online travel communities. These authors proposed timeliness, completeness, structure and personalization as crucial information quality variables. In their framework, *timeliness* refers to the fact whether information is up-to-date, i.e. whether information is still correct or has already become obsolete. *Completeness* is characterized as the ability of a medium to serve information needs. The authors distinguish between two aspects of completeness: How completely does an information system answer the traveler's information request and how complete is the retrieved information. *Structure* refers to the presentation of information and can greatly affect efficiency of information access. *Personalization* refers to the possibility to access information that is specifically relevant for somebody's own context.

In the following sections, we will elaborate on these dimensions and will explicate connections between our framework and the proposition by Schwabe and Prestipino. Section 4.1 will discuss the aspect of discourse completeness, Section 4.2 the aspect of discourse timeliness or correctness and Section 4.3 the aspect of the internal discourse quality.

4.1 Conceptualizing and measuring discourse completeness[8]

4.1.1. Conceptualizing discourse completeness

The aspect of information completeness – or in our nomenclature discourse completeness – is not trivial. Batini et al. (2009) define completeness as "the degree to which a given data collection includes data describing the corresponding set of real-world objects". The approach chosen by Batini et al. is influenced by the concept of a structured data base that holds information about real-world objects. Since the contents of a data base are usually well defined it is possible to conceptualize completeness in this absolute sense. For online communities, however, the conceptualization of completeness is more complicated. Firstly, the aspect of information completeness has to be understood against the background of a person's information need. In a first approach to this concept, one

[8] The following sections on information completeness are taken from: Prestipino, M., Aschoff, F.-R. & Schwabe, G. (2006). What`s the use of guidebooks in the age of collaborative media? Empirical evaluation of free and commercial travel information. Proceedings of the 19th Bled e Conference "eValues". Bled, Slovenia, June 5-7, 2006. Minor modification regarding the wording were made. The article was re-framed to some degree by including it into the general discourse quality framework proposed in this thesis. The basic contributions of this article including hypothesis, research methodology and interpretation of results, however, were not affected by this.

could argue that there is something like "complete information" in an absolute sense with respect to a specific question or a specific information need.

This might indeed be the case for some specific examples. Let's assume a traveler would like to have a list of all hotel rooms in Zurich that are below 100 Franks per night. In this case, it would indeed be possible to compare the results that are returned by an information source with the real number of hotel rooms in Zurich that are below 100 Franks (given that we would somehow be able to obtain the real number.) For such a case it would even be possible to express the "information completeness" of a system in percentage and compare a number of information sources on this unambiguous indicator.

Given the reality of travel-related information needs as well as the information that is usually exchanged in online travel communities, however, we deem these kinds of examples as rather exceptional and not representative for the usual information need a traveler has. In preparation of the discourse completeness study that we are going to report here, we asked participants to brainstorm typical travel-related questions (see 4.1.3 for more details). After a consolidation phase, we ended up with nine typical questions (translated by the author):

1. What activities do you recommend for a one-week stay in a specific region?
2. How safe is a specific region for tourists?
3. Which means of payment do you recommend in a specific region?
4. Are there health risks one should be prepared for when visiting a specific region?
5. How can I use my mobile phone in a specific region?
6. Where are good flea markets in a specific region?
7. Where can I meet locals as a tourist?
8. How can I get from the airport to the city center, especially at night?
9. How much money do I need for a three-week low budget trip in a specific region?

These questions show that "information completeness" understood in an absolute sense as described above cannot be measured for most of these questions. One aspect is that many of these questions target a complex solution spaces. For example, "Where are good flea markets?" expresses already two information needs: Firstly, the need to know about "good fleamarkets" and secondly the need to know the locations of these fleamarkets. This already makes the definition of an absolutely complete answer difficult. In addition, it is difficult, if not impossible, for many questions to define the "100% solution". It is, for example, difficult to objectively generate all possibilities how one could meet locals during a travel because the options and strategies are probably infinite and can be very

creative. Finally, very open questions like general recommendations for a certain travel destination or how much money is necessary for a certain trip obviously defy the limited approach to information completeness that was introduced above.

For these reasons, we chose a different approach that was developed from the perspective of a traveler. Based on Schwabe and Prestipino (2005), we argue that the value of travel information, finally, is to increase travel quality including fun, knowledge and decision making. Thus, the goal of obtaining information for the traveler is to make him or her more actionable in the traveling context. This aspect is also reflected by the generated travel-related question. They are all formulated in a way that travelers are able to do something or make a certain decision after the question has been answered. This aspect is also related to Kuhlen's (1998) statement that "Information is knowledge in action" meaning that information exists only in a certain context and with regard to a certain need. Thus, information quality is mainly to be evaluated from the user's point of view. Therefore, we conceptualize completeness as the degree to which sufficient information is given to enable a person to take action or make a decision. In the following study, we will ask participants to rate information that was extracted from online travel communities as well as printed travel books based on this question. More specifically, with discourse completeness we mean how complete the sum of the replies to an initiated discourse are deemed from the perspective of the discourse initiator.

4.1.2 Hypothesis

Aim of this section is to assess information completeness in guidebooks and virtual communities. Guidebooks are produced by for-profit companies engaging several distinct professional roles: paid authors, graphic designers, publishers and so on. The book is produced in a systematic process, usually benefiting from experiences made with the production of earlier editions. Lonely Planet guidebooks and its rivals often exceed 1000 pages of densely printed pages. It is an information product, which cannot tailor information interactively to a highly specific need. The information therein is based on the knowledge of a small number of persons.

A virtual community has no distinct authors; instead it connects a large number of people, who all may contribute their knowledge independent of physical location and time. A virtual community enables communication between humans, i.e. questions are asked in natural language, allowing for fine distinctions and high expressiveness. Questions may be clarified in a conversation, as often the full or real information need is not clearly known in advance to the asker (Belkin et al. 1982). Communication in the virtual community is immediately visible to others, so it is possible to add missing or

correct wrong information. Unlike with guidebooks, any member of the community can immediately share his experiences. The effort of producing information is distributed among the community members, who contribute without financial reward, thus resulting in cost free information provision. Information is produced mostly when it is requested for the first time, and therefore has not to be conceptualized in advance. While electronic guidebooks may offer almost unlimited storage capacity, the cost of entering all information possibly relevant to any user would defy a commercial business model. Such an information system would also need to provide a correspondingly powerful way of specifying queries. Also users may lack the ability to use a complex retrieval system and artificial query language.

In summary, virtual community may provide tailored, reviewed information produced by a large number of contributors using natural language. Because

- more contributors produce information,
- information is reviewed by a large number of contributors who can check and fill in missing information,
- user's information need is specified using natural language,

we see reason to propose the following hypothesis:

Virtual Communities have higher information completeness than printed guidebooks.

4.1.3 Methodology and data collection

The rigorous comparison of printed guidebooks and information provided by virtual communities poses many challenges. We will describe these challenges in the following three paragraphs and we will provide our solutions in the subsequent sections on sample size, question generation and how we summarized the answers from the respective information sources.

1. Representative sample size: As it is clearly not feasible to study all guidebooks or all tourism communities, the choice of a representative sample is key. There are two approaches to make representative choice of communities: Either one chooses to standardize the communities (interaction form, size, language etc.). One can then argue that a specific form of community is superior or inferior to a specific kind of guidebook. This requires good knowledge of the relevant tourism community dimensions to be standardized. This knowledge is lacking. We therefore choose to follow the second

approach and to take the "knowledgeable traveller's" perspective. A knowledgeable traveller chooses a virtual community that is easy to find, seems to be large and active (judging from the archive of past communication) and clearly denotes it is relevant to the topic he is interested in, e.g. by its name or motto. As for guidebooks, he will choose a highly visible and well-known brand (i.e. the Lonely Planet guide). In order to check the stability of our results we purposefully choose countries of different size.

2. Selection of questions: While it may be possible to analyse the content of a guidebook, this approach is clearly not feasible for a large tourism community. Thus we evaluated the completeness according to a standard set of "typical" travel questions. The choice of questions is paramount for a fair comparison of media. A group of neutral travellers generated those questions reflecting their travel experiences (see below for details).

3. There is no absolute measurement for information completeness. Thus, we used raters to assess information completeness. If the raters would know the treatment (i.e. whether they rate a travel book or a community) they may be biased. We therefore introduced an intermediate step of summarizing the identified information before presenting it to the raters. For evaluation, the raters received a randomized mixture of summaries from both treatments.

Failure to systematically address those three methodological issues led us to check the results of our prior exploratory studies (Prestipino & Schwabe 2005). We now believe the study design (see Figure 4.1.2) is a research contribution itself. It may help comparing the information quality between conventional media and digital media in other contexts.

Choosing a representative sample size

Guidebooks and discussion spaces for the following five countries were evaluated: Brazil, Australia, Great Britain, Greece, and United States of America. All guidebooks used were published by Lonely Planet, one of the most popular guidebook publishers for independent travellers, and the latest edition available[9] was used in all cases. The virtual communities were chosen based on the clear focus on the respective country and the time they had been alive (to minimize the risk of a community suddenly "dying" during the study). Activity rates for the virtual communities were calculated by using automated counting tools or by manually counting representative months of the four quarters of

[9] Britain:5th ed. March 2003;Greece: 6th ed. March 2004; USA: 3rd ed. March 2004, Brazil: 5th ed. January 2002; Australia: 12th ed. January 2004

2005 (i.e. January, April, July, and October). The countries, the respective discussion spaces as well as activity rates are shown in Table 4.1.1.

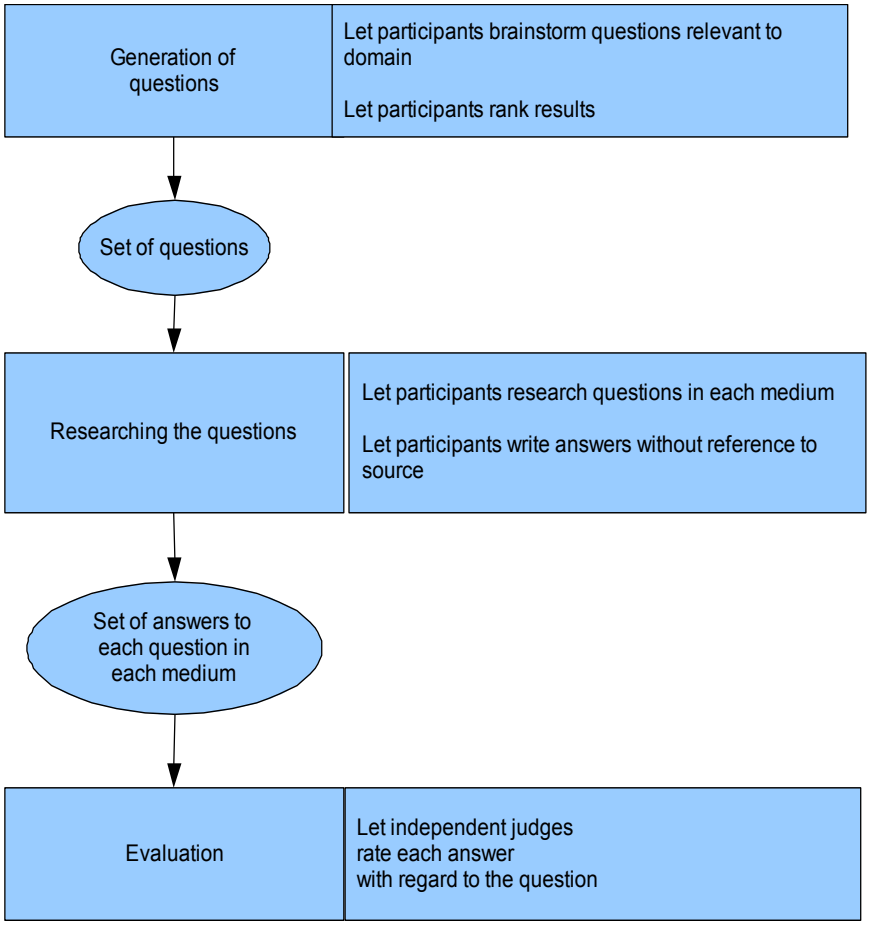

Figure 4.1.2: A three-phased research procedure for the empirical assessment of information quality

Generation of travel-related questions

The test questions for our evaluation were generated by conducting a brainstorming session with five recruited participants. The researchers did not participate in the brainstorming, but moderated the session. Participants were asked to anonymously generate typical questions they knew from preparing a travel. In a second step, each participant ranked the resulting questions. After consolidation, nine questions from the twenty highest-ranked questions were taken (after excluding those redundant or not suited for diverse countries, e.g. “can I communicate in English?”, obviously unsuitable

for asking about English-speaking countries) and adapted, i.e. the question about safety of a destination was put in the context of the respective countries by choosing a city.

Table 4.1.1: The evaluated virtual communities for the five countries and activity rates

Country	Online Community	Average number of messages per month (2005) [10]
Brazil (BRA)	Virtual Tourist Forum http://www.virtualtourist.com/	461
Australia (AUS)	newsgroup rec.travel.australia+nz	370
Great Britain (GB)	Thorn Tree Forum UK & Ireland http://thorntree.lonelyplanet.com /categories.cfm?catid=25	5238
Greece (GRE)	newsgroup alt.travel.greece	96
United States of America (USA)	newsgroup rec.travel.usa-canada	1821

Summarizing answers provided by guidebooks and communities

Subsequently, the list of questions was researched by nine different participants who used printed guidebooks as well as virtual communities to answer the questions. Participants were given an introduction into the guidebooks and the Internet communities. To generate information from virtual communities, participants would formulate a question and post it in the chosen discussion space of a virtual community. Answers posted to this question by the community would be evaluated after two weeks in a second session. They would also search discussion archives afterwards.

As an example, the question "Who can tell me where the best flea markets in Sidney are?" led to several answers in the forum, including the following:

[10] Due to the continuous and extensive deletion of community content in the Thorn Tree Forum provided by Lonely Planet, we took the data of January 2006 to estimate the number of discussion threads per year. The estimation is a conservative one, probably slightly underestimating the real number. Data for the newsgroups was gathered using Google Groups, e.g. http://groups.google.com/group/rec.travel.usa-canada/about

“Dunno about flea markets, the real ones usually get announced on fliers etc. But if you like markets, check out Glebe Market (at the school, Saturday mornings), Bondi market (Sundays, I think?) and Paddy's market (week-ends, Fridays too now I think). Personally, I liked the one in Glebe.”

Finally participants would write a short text with relevant information they gathered from the respective source. The rationale for this design is that the persons evaluating these texts in the next step would not know whether information came from a guidebook or a virtual community, thus avoiding a possible bias. There was a large time limit given, which was never passed. The research of the nine participants resulted in 90 pairs of questions and researched answers (nine questions x five countries = 45 per medium).

4.1.4 Evaluation

To avoid distorting effects caused by exhausted participants and keep time and effort for them within reasonable limits, the 90 question-answer pairs were divided into three sets, each containing 30 pairs. Hence, one group consisting of nine subjects evaluated one set, i.e. 30 pairs. These 30 pairs consisted of 15 pairs extracted from the printed guidebooks and 15 pairs extracted from the virtual communities. The sets were created randomly, but in a way ensuring that both conditions for the same question and country were not evaluated by one person and that each question type (1-9) was evaluated by each group.

The 27 participants were given the question/answer pairs of their set and asked to judge a given answer in relation to its respective question. In order to avoid overly sceptical judgement and judges looking for a rather elusive concept of perfect information, the following question was asked: “Is the information given sufficient to enable me to take action or make a decision?”

We recorded two different measures. Firstly, participants were asked to evaluate each question/answer pair by judging if the answers contained sufficient information for further action or decisions. This measure was recorded as a dichotomous measure since participants only had the possibility to answer with yes or no. Secondly, participants were also asked to rate the answer on a rating scale from 6 to 1 whereas 6 stood for a “very sufficient” answer and 1 stood for a “very insufficient” answer. We recorded the dichotomous measure to force participants to come to a clear decision if they would actually use the information in a real situation. The rating scale was used to gain a more fine grained measure which allowed us to compare the two media on a more differentiated statistical base. Concerning our hypothesis we state correspondingly that:

H1.1 For the dichotomous measure, virtual communities have higher information completeness than printed travel books.

H1.2 For the rating scale, virtual communities also have higher information completeness than printed guidebooks.

4.1.5 Results

The difference between the "printed guidebooks" ratings and the "virtual communities" ratings were assessed by calculating their means and using statistical inference tests for the dichotomous measure as well as for the rating scale. To assess the quality of our ratings, we calculated the interrater agreement among our evaluators. Finally, we discuss the importance of a community`s activity for its information quality.

Judgements for the dichotomous measure (yes/no)

The proportional agreement to the dichotomous measure (yes/no) for the two media "printed guidebooks" and "virtual communities" as well as for the five countries are shown in Figure 4.1.3. On a descriptive level the figure shows that for four countries the virtual communities have a higher proportional agreement to the question "Is the information given sufficient to enable me to take action or make a decision?". The difference amounts to at least .06. Only for one country (Greece) the proportional agreement for the virtual community is .1 lower compared to the agreement for the printed guidebook.

Because of the comparatively low interrater agreement (see section 4.3), we used the arithmetical mean of the nine raters for each question for further analysis. The overall proportional agreement to the items in the "printed guidebook" condition resulted in M = .731 (STD = .303) whereas the agreement for the "virtual community" condition resulted in M = .815 (STD = .237). A paired t-test for these aggregated ratings failed to reach significance with $t(44) = 1.379$; $p = .175$.

The slight advantage of virtual communities for the dichotomous measure fails to reach statistical significance. Therefore, we have to reject our hypothesis H1.1 that for the dichotomous measure virtual communities have a statistically higher information completeness than printed guidebooks. However, our data strongly indicate that virtual communities are at least on an equal level compared to printed guidebooks.

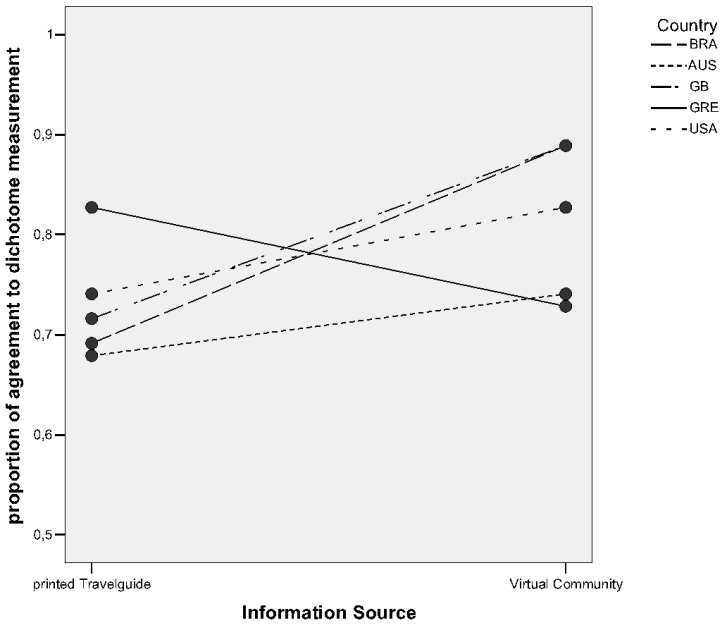

Figure 4.1.3: Proportional agreement to the dichotomous question: "Is the information given sufficient to enable me to take action or make a decision?"

The power of our test amounts to $\lambda = 10$ for an effect of $\Omega^2 = .1$, which results in the probability of committing a Type II error of $\beta < .1$. Hence, the probability of virtual communities having lower information completeness than guidebooks can be considered as exceedingly low.

Judgements on the rating scale (6-1)

The mean ratings on a scale from 6 to 1 for the two media "printed guidebook" and "virtual community" as well as for the five countries are shown in Figure 4.1.4. Again, the figure shows that for four countries the communities are evaluated higher by at least .31 scaling points compared to the printed guidebook. Only for Greece this relationship was reversed: the virtual community was evaluated lower by .67 scaling points compared to the printed guidebook. Hence, the results of the rating scale correspond to the results of the dichotomous measure. This can be taken as an indicator that participants understood these two measures in the same way and filled out the questionnaires attentively.

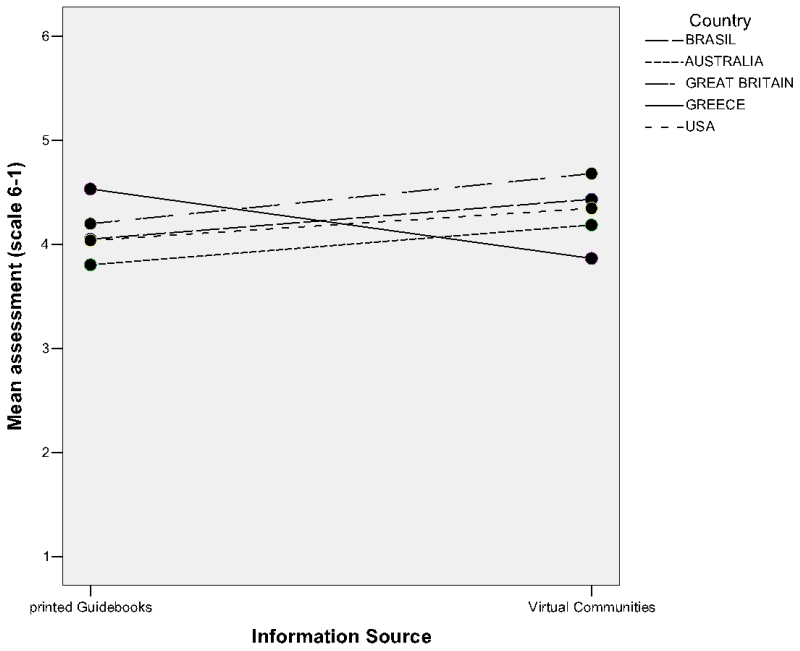

Figure 4.1.4: Mean assessment rates (scale 6-1) for the two media "printed guidebooks" and "virtual communities" as well as for the five countries

The aggregated arithmetical mean for the "printed guidebook" condition turned out to be M = 4.12 (STD = 1.01) whereas the mean for the "virtual community" condition turned out to be M = 4.30 (STD = 0.87). A paired t-test failed to reach significance with t(44) = -1.034; p=.31. The results of the rating scale correspond to the results of the dichotomous measure. The slight advantage of the virtual communities fails to reach statistical significance. Therefore, we have to reject our hypothesis H.1.2 that for the rating scale virtual communities have a statistically higher information completeness than printed guidebooks. As pointed out in section 4.1 our data strongly indicate that virtual communities have at least the same level of information completeness as printed guidebooks.

Interrater agreement

To assess the interrater agreement of the dichotomous measure (yes/no) we calculated Krippendorff's alpha (Krippendorff 2004) for each of the three groups since within one group all participants evaluated all questions. For the nine participants of Group 1 this index turned out to be $\alpha = .269$, for Group 2 it turned to be $\alpha = .321$ and for Group 3 it turned out to be $\alpha = .443$.

To assess the interrater agreement of the rating scale (6-1) we calculated intraclass correlations for each of the three groups. The ICC (2-factorial, not adjusted) value for

single measures for Group 1 turned out to be .387, for Group 2 it turned out to be .425 and for Group 3 it turned out to be .568.

Because of the low interrater agreement which points to a low reliability of single ratings, we decided to take the arithmetical mean of the nine raters for each question for our data analysis. Even though this results in a loss of power for statistical analysis this seemed to be a more reasonable advancement in our case since the reliability can be increased decisively by calculating the average between a number of raters. The ICC (2-factorial, not adjusted) value for average measures shows this increase in reliability. For Group 1 it turned out to be .85, for Group 2 it turned out to be .87 and for Group 3 it turned out to be .92.

Community activity as factor for information completeness

A comparison of the five virtual communities showed that the community covering Greece differed strongly from the other four communities. The community about Greece had decisively lower activity values than all other communities. The community covering Australia which had the next higher activity values had on average almost four times as many messages per month for 2005.

After comparing printed guidebooks and virtual communities over all our data we also analyzed our data without Greece which resulted in an evaluation only including virtual communities with an average number of at least 370 messages per month. For the dichotomous measure this analysis resulted in a mean over aggregated ratings for the printed guidebooks of M = .707 (STD = .319) and in a mean of M = .836 (STD = .205) for the virtual communities. A paired t-test turned out to be significant on a significance level of $\alpha = 0.1$ with $t(35) = -1.959$; $p = .058$ (2-tailed). In accordance with Bortz & Döring (2002) we used $d = ((\mu 1 - \mu 2)/\sigma diff)) * \sqrt{2}$ to determine the effect size for this paired t-test. The effect size for the dichotomous measure resulted in d = .462 which can be regarded as a small to medium effect size.

For the rating scale (6-1) this analysis resulted in a mean over aggregated ratings for the printed guidebooks of M = 4.023 (STD = .950) and in a mean of M = 4.412 (STD = .753) for the virtual communities condition. A paired t-test turned out to be significant on a significance level of $\alpha = 0.1$ with $t(35) = -1.871$; $p = .070$ (2-tailed). The effect size for the dimensional scale calculated the same way as the effect size for the dichotomous measure resulted in d = .441.

Interpretation

In this study, we systematically compared information completeness in printed guidebooks and virtual communities. While the slight advantage found for virtual communities does not reach statistical significance, our results show that virtual communities have at least the same level of information completeness as guidebooks.

Our results showed advantages of the virtual communities compared to the guidebooks for four of our five investigated countries. The activity rates for these countries show that the virtual community covering the respective country (Greece) has a decisively lower number of messages per month compared to the other researched communities. We conclude that besides the period of time a community has been active the activity rate of the community is a crucial factor for the provided information quality. If data for Greece is omitted which means only including virtual communities with an activity level of at least 370 average number of messages per month virtual communities have an significantly higher ($p<.1$) level of information completeness.

For further research we would, therefore, consider a reformulation of our original hypothesis. We assume that information quality, especially completeness but presumably also other quality attributes, strongly depends on activity parameters of the community. To define crucial activity parameters (e.g. number of authors, number of messages, number of replies etc.) and to detect decisive thresholds relating to information quality seems to be a fruitful approach for further research.

4.1.6 Conclusion

In this paper we presented a rigorous design for evaluating information completeness from a user's point of view and could show that free virtual communities are able to produce satisfying information products. Earlier exploratory studies (Prestipino & Schwabe 2005) showed similar results, but were possibly biased towards questions suited for virtual communities and lacked rigour. In the study presented in this paper the questions were rather general: almost no context information or individual preferences were provided. Thus, the potential of virtual communities to create highly individualized information using natural language communication was not fully exploited, and better results might be expected if such questions are evaluated. For abstract concepts like information quality the comparatively low interrater agreement is a difficult problem, which may be addressed by more thorough training of participants. With reference to rated information quality we found an outlier for the least active virtual community.

Further research is needed if this is a consistent, inherent characteristic of virtual communities and if categories of activity level and quality exist.

In another comparison by Giles (2005), Community based information from Wikipedia (http://en.wikipedia.org/) and the Encyclopaedia Britannica was examined by domain experts. Wikipedia was found to be almost up to the Encyclopedia Britannica, with the same number of major mistakes and a higher amount of smaller errors, omissions and misleading statements.

While more data is needed, it may be possible that virtual cooperation technology has changed transaction cost for collaboration such that commercial manufacturing of information by small groups of professional authors may not be necessary any more for certain domains. This would end the age of information asymmetry where few information producers provide information to many consumers without scrutiny and without the possibility of free public feedback or discussion: in a virtual community every person may share his experience with others. For tourism, this has a significant impact: not only might guidebooks be replaced by free collaborative information spaces created by virtual communities, e.g. Wikitravel (http://wikitravel.org/). Also, travellers using community based information own a stronger position against service providers, as they do not have to rely on advertisement, and low-quality services and scams are published much more. Better information leads to better travel quality, as it improves decision-making and learning about other countries and culture. For information providers it means they have to rethink their role: rather than organizing the production of content for information products, they should take on the role of value-adding moderators who add quality control to community processes and improve or change existing content for specific customer groups or domains, by structuring, rewriting or packaging content. Another opportunity is the integration of companies related to a community's domain, e.g. tourism companies. How can these companies use virtual communities as a way of distributing information and interacting with community members?

For scientists our results motivate the need for further research on virtual communities as information systems. While many research activities are found about social processes in communities, we lack insight about quality aspects and how the creation and distribution of information may be supported by better tools. Virtual communities today use tools designed decades ago. We believe there is large potential in improving support tools for these communities.

4.2 Conceptualizing and measuring discourse timeliness and correctness

In this section we will conceptualize timeliness as well as the related concept of correctness in online communities and will demonstrate how these constructs can be measured empirically. First, we will discuss the conceptual similarities and differences between the concept of timeliness and correctness (Section 4.2.1). Then we will propose a first conceptualization of the construct of timeliness for online communities as well as for commercially printed travelbooks (4.2.2). We will then report first empirical data comparing these two publication models and discuss the implications (as published in Prestipino, Aschoff & Schwabe 2007). In a second part of this section (4.2.8), we will propose a more refined model of timeliness in travel information sources. We will present further data and discuss the respective implications (as published in Aschoff, Prestipino & Schwabe 2007).

4.2.1 Disentangling timeliness and correctness

Timeliness refers to whether information is up-to-date and available to the user in an acceptable timeframe. Timeliness is mentioned in most frameworks on information quality (Eppler 2003). Different terms are used for aspects of this concept. Bouzeghoub et al. (2004), for example, uses the term "timeliness" for the frequency of change and "currency" for the age of information. Eppler (2003) uses "timeliness" for the ability of the system to deliver useful information in time and the term "currency" for the ratio between up-to-date and outdated information. In Gertz et al. (2004) timeliness and freshness are aspects of currency, which is defined as „the degree to which recorded data is up-to-date". Ballou et al. (1998) decomposes timeliness into "currency" and "volatility", the former being the age of the data and the latter describing the time span during which data are valid. Finally, Rittberger (2001) uses currency and timeliness as synonyms. While these different conceptualizations are often hard to integrate, they also lack, in many cases, concrete applications of the suggested measures for evaluations of up-to-dateness in information sources. Thus, auditing timeliness of existing information systems is an open research problem and is critical for management of information production (Bouzeghoub et al. 2004).

In addition to this, the aspect of timeliness, i.e. whether an information is up-to-date, is closely related to the aspect whether an information is correct. Both aspects refer to a comparison between the information that is retrieved from some media source and the "real-world" entity that this information refers to. If the information that is retrieved

from the media source is congruent with the "real-world" entity at a given point in time, then this information is said to be correct (See Figure 4.2.1 for an illustration).

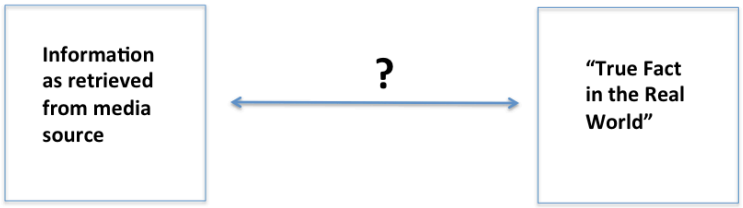

Figure 4.2.1: Illustrating the congruency between information and the "real world" entity

In this case, the information can also be regarded as up-to-date. Based on this definition, one could argue that every information that is correct is also up-to-date. Timeliness or up-to-dateness, however, has an additional connotation. Timeliness, actually, is a more complex construct. While correctness is only concerned with a comparison of the information from the media with the "real-world" entity, timeliness targets the different developments the information from the media as well as the "real-world" entity can take. In addition, timeliness implicates that there has been a match between the media source information and the "real-world" entity at least at some point in time. Incorrectness, on the other side, does not make an assumption about this or rather implicates that the information has never been correct. Thus, on an abstract level when measured at any point in time, we argue that timeliness and correctness can be detected the same way: the information in the media source is not congruent with the "real-world" entity. Timeliness and correctness, however, make different implicit assumptions about who or what has caused this incongruency. When refering to timeliness one seems to assume that the information has been correct at some point in time and that the reason for the mismatch is a divergent development of the media information and the "real-world" entity over time. Incorrectness rather seems to imply that there has never been a match between the media source and the "real-world" entity and that this mismatch is due to human failure (e.g. lying or nescience) or system failure (e.g. measurement errors, programming errors etc.). Thus, a lack of timeliness or a lack of correctness might also have different implications regarding the strategies to improve the situation. Incorrectness would usually call for checking the input source that entered information into the information system while a lack of timeliness could mean that the information has to be extracted from the "real world" entity more often to keep the system up-to-date.

In this thesis, we will mainly conceptualize the aspect of timeliness by explicating models that describe crucial phases of the life-cycle of information as it propogates through the information distribution process. Our empirical measurement at the end will assess the relation between the information and the status of the "real world" entity as illustrated in Figure 4.2.1. Thus, while our abstract conceptualization targets the more complex construct of timeliness, our measurement also assess the correctness of the community-based as well as the commercial distribution model. Finally, we have to note that the concept of timeliness and especially correctness do only make sense from a positivistic perspective on the world that assumes that facts can be objectively assessed. While this might not be possible for all content that is discussed in a community, we argue that correctness is still a crucial factor of the discourse especially when it is compared to traditional media.

4.2.2 Attributes for the timeliness dimension (initial approach) [11]

In this section, we propose attributes for the concept of timeliness from a user perspective and describe how they relate to information products and online communities. *Up-to-dateness* can be conceptualized as the match between the *information retrieved* and the *original information* (see Figure 4.2.2).

In a first step, this information needs to be *observed* which can already lead to errors or inaccuracies. In a next step this information has to be *encoded* into some medium (i.e. usually written down). The *time-to-publish*, then, is the time from which the author writes something down and hands it on to the next instance until the reader is able to read it. This time is relatively long for traditional print media and comparatively short for Web-based publications. *Speed* measures how long it takes until information to a posted question is received. For the case of online communities, this time is largely depending on the activity of the peer community members. Note that a non-interactive usage of an online community, e.g. by searching the archive, is similar to conventional usage of information products, e.g. books or IS.

Accessibility, defined as the „capability of being reached, capable of being seen or used" (Eppler 2003), may also be considered for the timeliness dimension, but introduces issues much more dependent on the individual user and the content. A user with high competency in information retrieval may retrieve information much faster than a novice.

[11] This first study on the dimension of information timeliness was taken from: Prestipino, M., Aschoff, F.-R. & Schwabe, G. (2007). How up-to-date are Online Tourism Communities? An Empirical Evaluation of Commercial and Non-Commercial Information Quality. Proceedings of the 40th Hawaii International Conference on System Sciences (HICSS-40). Waikoloa, Big Island Hawaii, January 3-6, 2007

Similarly, good structure of content may reduce search time significantly. In an online community a user does not have to use any restricted query language or mechanism, as he poses questions in natural language. Kahn et al. (2002) describe accessibility as: „the extent to which information is available, or easily and quickly retrievable". While no further explanation is given, the extent to which information is quickly retrievable is certainly related to the timeliness dimension. But as it is difficult to measure in itself, we treat it as a set of factors influencing the speed attribute. Of course a guidebook is easy to be taken along, so its accessibility may be higher in this regard. But with the advent of ever more powerful mobile devices, this may change. To allow for a meaningful interpretation of timeliness measurements, we compare online communities to a standard benchmark. The standard on the market for travel information is the most popular information product for travellers, the printed guidebook.

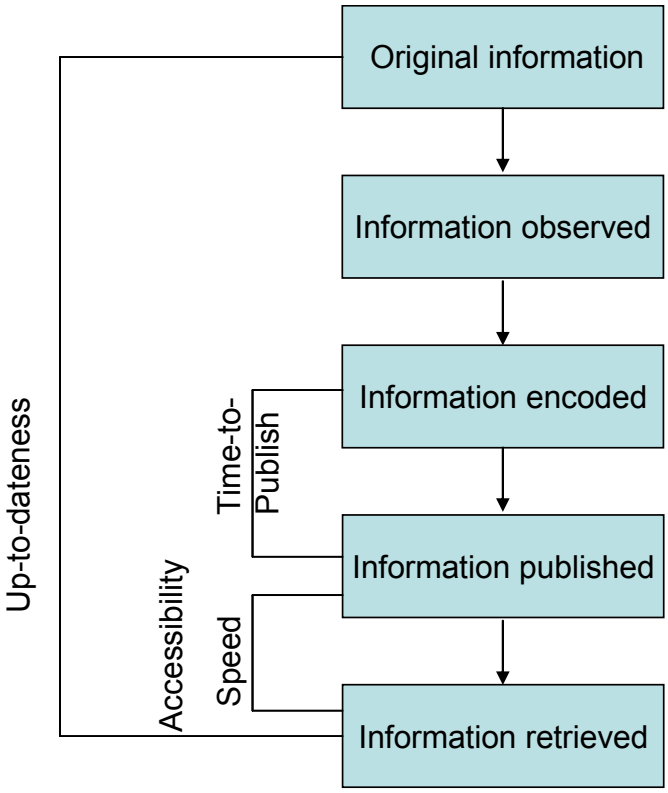

Figure 4.2.2: Elements of timeliness

4.2.3 Timeliness – comparing different distribution models

This section will describe timeliness in the processes of information creation and distribution for an information product and an online community. The process of creating an information product – a guidebook in our case – involves a sequence of several phases:

1) Research and writing phase, in which information is collected and condensed in structured text. 2) Printing and deployment phase, in which books are produced and shipped to vendors. 3) Selling and usage phase during which time and consumers may obtain the book until it is no longer available and possibly replaced by a newer edition. Usage of a particular edition, of course, continues long after it has been out of print. As the research and writing phase is carried out by a limited number of people, it spans over a non-negligible period of time, meaning that some information collected in the beginning may already be outdated towards the end of the phase. Printing and deployment may take several months.

To cope with the tremendous amount of information, some information may be poorly researched or taken from previous editions without sufficient checking. Typing, translation or communication errors may occur during creation of a manuscript. Hence, even when deployed, a guidebook contains information that is outdated or was incorrect in the first place. Afterwards, the guidebook's up-to-dateness is subject to continuous degradation. As the information product grows older, more and more information is outdated and thus wrong. Of course, the volatility of information units varies, e.g. historical, geographical or cultural information has a longer lifespan than accommodation or transportation information. The publisher may produce a new edition, and the cycle begins anew. Up-to-dateness is dependent on the time span between updates and the frequency of changes to the information contained in the guidebook in the real world. The obvious solutions would be to a) shorten the lifetime of editions to improve upto-dateness, but this would cut down on revenue per edition (assuming sales would not increase significantly), or publishers would need to justify a higher price. Because of limited resources, a reduced time span may be insufficient for thorough research, lowering information quality. b) include only information that changes with a frequency suited for the production cycle, leaving out more volatile information. In an online community, information is usually immediately available through the system after it has been written; creation and deployment do not delay the usage phase noticeably. Information may be added, commented or changed directly dependent on the technology. Outdated information may thus be updated and corrected at any time, as there are no

discrete editions. Content creation in communities is decentralized to an unlimited number of authors, as there is no separation between readers and writers. So the gap between real-world observation and writing (and publishing) may be much shorter than with books. An unlimited number of contributors may participate. While the author of a printed guidebook has to report his findings back to the editorial office where his information undergoes further refinement, a traveler on a journey can immediately update information of the community in any internet café and, thus, make it available to all community members.

Consequently, online communities are capable of mediating short-lived information that is too volatile to be distributed via information products; examples include weather conditions or local events where time between observation and obsolescence is short. On the other hand the externalized information in a community system is not updated in a formalized process, such as editions for a book. There are no guidelines for quality. Thus information units may differ substantially in up-to-dateness. While authors of a guidebook receive monetary compensation and thus may have an obligation to provide a certain comprehensiveness and quality content, money does not lead to intrinsic motivation for knowledge based work (Frey 1997, Osterloh et al. 2002).

Another major difference is that online communities offer an additional retrieval mechanism: besides using information units already available in the community archives, a user may ask for information in a board. Other community members may then answer his request. The time span between request and answer is determined by the activity of the community, i.e. how many users read requests and discussions and then write answers in a given time span. However, this time span does not necessarily indicate the up-to-dateness of the information, as the person writing the answer may have acquired this information long ago, for example on a trip he once made, without the ability to recheck if it is still correct. As a community does not release information at defined intervals, its up-to-dateness is not influenced by publishing intervals, but depends on the activity of its members and its motivation and ability to keep the content up-to-date. Information is only partially stored in databases, as the externalized information visible in the system represents only part of the knowledge the online community has through its members. Information is added to the system on request, e.g. following a question in a discussion board or as a reaction to the discovery of incomplete or erroneous information in a wiki. Hence, it is not only the influence of the (technical) delivery mechanism influencing but also the speed of the creation process that determines overall speed. Lonely Planet uses a drastic way of keeping its discussion forum's up-todateness high: we found that most posts are deleted after a few weeks.

Table 4.2.1: Elements of timeliness in guidebooks and online communities

	Guidebooks, information products	***Online community***
Time-to-publish	Dependent on resources for creating new editions on a profitable basis, usually several years	Dependent on technical factors, usually negligible
Up-to-dateness	Dependent on resources invested in creation and age of edition	Dependent on community activity
Speed	Dependent on technical factors (network bandwidth, hardware), low if information is available	Dependent on community activity
Accessibility	Structured content, non-interactive, no tailoring of information, portable	Natural language retrieval, tailoring of information, access through standard internet connection

Table 4.2.1 summarizes the differences between the guidebook and the online community. It is interesting to see that while Time-to-publish in online communities is negligibly low, it is not in guidebooks, while it is the opposite for the speed attribute. In a guidebook, information that is available is usually found quickly, influenced by accessibility features like structure. In an online community, it depends on the activity profile, i.e. how many users read and write and how often they visit the online community and how quickly they react. Accessibility has a bundle of factors influencing timeliness attributes. In an online community, natural language, proactivity and feedback are the main factors, while the guidebook can easily be taken along by the traveler and has a proven structure allowing for quick access to elements included in the structure. The structure may even be improved by manipulating the guidebook, e.g. tearing out or annotating pages.

4.2.4 Hypothesis – Study 1

The rest of this article will focus on assessing up-to-dateness in an information product and an online community. Up-to-dateness is a central attribute with a high influence on the overall value for the information user; information with a low up-to-dateness may be considered useless in spite of being high in other attributes. While assessment of speed is

relatively easy to measure and can be automated in computer mediated communication systems, assessment of up-to-dateness requires a complex design. We are not aware of any other studies of up-to-dateness in online communities. Our research interest lies in the question whether a non-commercial, non-centrally organized organization like an online community may be capable of producing information which is satisfying in terms of up-to-dateness. We define satisfying here as the capability to match a professionally produced guidebook. We were also interested in developing and testing a method for empirical assessment of up-to-dateness in both media. As discussed above, both media feature characteristics that should contribute to up-to-dateness. In a summative analysis we will test which combination of characteristics leads to a better up-to-dateness. We will not be able to explain the effects of single characteristics on the overall result. We assume that the long publication cycles of the guidebook versus the much shorter time-to-publish of the online community favor the community and will outweigh the more professionally organized process of the guidebook publisher. Hence, our hypothesis is that *Online tourism communities have a higher up-to-dateness than printed travelguides*. The next chapter presents an empirical analysis of this hypothesis.

4.2.5 Methodology and data collection – Study 1

Data set

To systematically compare the timeliness of printed guidebooks with the timeliness of online communities we assessed the up-to-dateness of information in each medium. As guidebook we chose a "Lonely Planet" guide which is widely used by independent travellers. For the online community we chose World66 (www.world66.com) which is a wiki community containing 79,923 articles on 21,862 travel destinations (according to World66).

As region for our evaluation we chose one of the most popular travel countries, namely Italy. We used the "Lonely Planet Italy" in its 6th edition (2004) which was the latest edition at the time of our evaluation. Correspondingly, we only used the section for Italy in World66. Data collection and verification took place between May 5th and June 8th 2005. For the evaluation of up-to-dateness we followed a two-step process. In a first step we collected an exploratory sample to gain insights into the character and the number of up-to-dateness relevant attributes of information items. This data sample consisted of a total of 328 objects with 164 objects chosen from the Lonely Planet Guide and 164 objects chosen from World66.

To gain a sample of objects we conducted interviews with travelers to generate a taxonomy with categories relevant for travelers. These categories included 1) General

Information, 2) Administrative Information (e.g., Visa information), 3) Medical Information, 4) Accommodation and Gastronomy 5) Public Transport 6) Sightseeing and Entertainment 7) Leisure time, sports and shopping and 8) Education. These categories were used as reference to identify travel-relevant information items from the printed guidebook as well as from the wiki. Within each of these categories objects were drawn in a randomized manner from the two media, but we assured that we covered big cities and touristic locations throughout Italy.

Each object was linked to a number of different attributes which were assessable with reference to up-to-dateness (e.g. opening hours, e-Mail addresses, fax numbers, phone numbers etc.). The analysis yielded a total of 10 different attributes such as these. Since the number of objects as well as the number of attributes were distributed unevenly across our categories we decided to draw a more controlled subsample in a second step. For this sample, we selected the three attributes for which a sufficiently big data set was available to assure a fair evaluation of both media and which allowed us to use sound statistical methods.

This sample was confined to the attributes “address”, “phone number” and “price”. Since the up-to-dateness of different attributes of the same object could be related to another (e.g. a restaurant moving to a new address may also change its phone number), we only assessed one attribute per object to ensure independent data values. This resulted in 40 objects for each of the three attributes (address, telephone number and price) as well as for each medium (printed guidebook and online community) resulting in a total of 240 evaluated objects. The decision which items of the original data set were to be selected for this more controlled data set was made by a random number generator to avoid a bias. To rule out that our sub-sample favored either the printed guidebook or the wiki in any way we calculated statistical inference tests for both our original sample as well as for our sub-sample.

Method

To evaluate the up-to-dateness we selected an object from either the Lonely Planet Guide or from the online community and assessed whether this information was still up-to-date (e.g. the phone number of the Peggy Guggenheim Museum in Venice). Information was verified by communication with the institution in question using phone calls or e-mail correspondence, or by checking on official websites. Some information was checked personally on the respective location and local travelguides were asked to check some of the elements. After a comparison of the information in the medium and the researched information, each object was categorized as either up-to-date or not up-to-date.

4.2.6 Results – Study 1

While the categories served as a tool to identify travel-relevant information items the number of retrievable items for the different categories as well as for the two media differed decisively. Thus, a sound comparison of up-to-dateness rates across these categories were hardly possible. The comparison of timeliness across categories was not in the scope of this paper and requires further research. Table 4.2.2 shows the up-to-dateness rates for the two media across the eight categories as well as the number of retrieved attributes.

Table 4.2.2. Up-to-dateness rates for the two media across categories (in percent)

Category	Percentage Up-to-date Lonely Planet	Percentage Up-to-date World66
General Inf.	43	27
N	*7*	*11*
Administr. Inf.	79	81
N	*24*	*16*
Med. Inf.	100	80
N	*11*	*5*
Acomm. Gastron.	72	73
N	*97*	*127*
Public Transp.	60	84
N	*42*	*19*
Sights. Entertainm.	61	66
N	*114*	*109*
Leisure Time, Sport, Shopping	71	63
N	*42*	*19*
Education	50	94
N	*12*	*16*
TOTAL	66	70
N	*349*	*322*

Since the number of retrievable objects as well as the number of total attributes varied across categories we decided to run a more controlled study with a subsample containing only three attributes with sufficient frequency for a statistical comparison.

Figure 4.2.3 shows the percentage of items which were up-to-date for the three attributes “address”, “phone number” and “price” as well as for the two media “printed guidebook” and “wiki community”. For the Lonely Planet guidebook the percentage of correct addresses amounts to .92, the percentage of correct phone number to .75 and the percentage of correct prices amounts to .22. For the wiki community the percentage of correct addresses amounts to .90, the percentage of correct phone numbers amounts to .80 and the percentage of correct prices amounts to .25. A clear difference can be seen between the two attributes “address” and “phone number” and the attribute “price”. We assume that this relates to the fact that prices usually change much more often than addresses and phone numbers, resulting in lower up-to-dateness values.

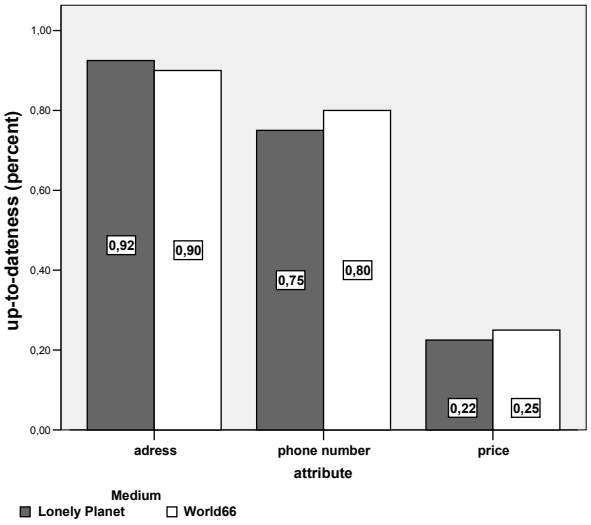

Figure 4.2.3. Proportional up-to-dateness for the three attributes as well as for the two media

For the two media, however, the frequencies are very similar. There is a slight descriptive advantage of the online community for the attributes “phone number” and “price” and a slight advantage of the printed guidebook for the attribute “address”. In accordance with Lunney (1970) we conducted a 3x2 analysis of variance with the two factors “attribute” (address, phone number, price) and “medium” (Lonely Planet, World66). The factor “medium” did not turn out to be significant ($p=.738$) whereas the factor “attribute” turned out to be highly significant ($p<.001$). The interaction also failed to reach significance ($p=.822$). Table 3 shows the result of this analysis. To rule out any possibility that the main results were distorted by the fact that we did not calculate up-to- dateness values over our entire original data set, we also did an overall analysis of the original set which

did not have an even number of attributes or objects for the two media. 66.76% of the objects from Lonely Planet were up-to-date (N=349) compared to 70.81% of the objects from World66 (N=322). An independent sample t-test did not result to be significant with t(669)= -1.128. Thus, we can conclude that a systematic difference between the media cannot be found for the controlled sub-sample nor for our original data set.

Table 4.2.3. Result of the analysis of variance

Source of Variation	SS	df	MS	F	Sig.
Model	119.25	6	19.20	133.8	.000
Attribute	20.36	2	10.12	68.55	.000
Medium	.017	1	.017	.112	.738
Atr*Med	.058	2	.029	.196	.822
Error	34.75	234	.149		
Total	154	240			

Hence, we have to reject our hypothesis that the online tourism community has a higher up-to-dateness than the printed travelguide. However, our data strongly indicates that the online communities are at least on the same level of up-to-dateness. To gain insight on the validity of this assumption we calculated the test power of our ANOVA factor "Medium". The power amounts to λ (df = 1, α = .05) = 26, 67 for a effect of $\Omega 2$ =.1. This results in the probability of committing a Type II error of β <.01. Hence, the probability for the online community having a lower up-to-dateness compared to the guidebook is exceedingly low.

4.2.7 Discussion – Study 1

Our analysis shows that the printed guidebook and the online community can be claimed to have the same level of up-to-dateness. This result holds for the overall calculation of the up-to-dateness values as well as for each of the three attributes "address", "phone number" and "price". Whereas addresses and phone numbers can be considered reasonably up-to-date (75% or more) the values are dropping considerably for the attribute "price" (25% or less) in both media. This aspect is of interest because it might prove fruitful to systematically investigate attributes of different volatility. Even though our analysis did not yield this result an evaluation with more attributes might show interesting differences. Online communities might be more suited for fast changing attributes or coordination activities of travelers, whereas for more stable attributes the printed guidebook could be as good as an online community. Thus, the observed non-profit self-organizing online community can keep up in terms of up-todateness with a

centralized professional content provider like a commercial travel guidebook. This similarity could stem from growing similarity in the information creation process: guidebook publishers increasingly tend to gather information from their clients, collecting feedback via email or hosting online communities with large discussion boards (cf. Lonely Planet's Thorn Tree). As we analyzed just one instance of each medium for one country, further research is needed for generalization of results and to gain an understanding of timeliness.

4.2.8 Empirical findings on timeliness in different travel information sources – Study 2[12]

In a second study, we expanded the evaluation by assessing forum communities as well. Furthermore, we improved the rigor of our study based on our experience in the first study. The first study had shown that information from different categories differed with respect to up-to-dateness. The same holds for attributes which can be allocated to information objects (e.g., the price of a hotel room changes more often than the address of the hotel). Thus, an evaluation of up-to-dateness should only assess objects and attributes from the same category to ensure a fair comparison of the assessed media types.

We therefore confined our study to two information objects evaluated in all three media types. The key was to find object categories which were crucial for independent travellers with respect to up-to-dateness. Accordingly, we published online surveys asking for aspects which – in case of out-of-dateness - were experienced as most annoying during travelling. Links to this survey were published in well-known travel communities (e.g., the Thorn Tree Forum). These surveys resulted in a ranked list of objects (like addresses of hotels, prices of restaurants etc.). We took the objects which were ranked high on this list and checked if sufficient items could be found in all six media to reach sufficient test power. These selection criteria resulted in two object attribute combinations: prices of accommodations as well as the name and address of restaurants.

To rule out that the results of our evaluation would only arise from the selection of a specific medium, we decided to assess two media for each media type. For the printed guidebooks we selected the well known "Lonely Planet" travel guide and the "Moon Handbook" published by Avalon Travel Publishing, one of the biggest independent travel publishers in the United States. Both editions were almost one year old at the time of evaluation[13]. As the typical revision cycle of popular travel guidebooks is two years, these editions represent the information in a form that is typical for the average traveller. For online forums, we selected the popular Thorn Tree Forum run by Lonely Planet as well as the Virtual Tourist Forum. For wikis, we selected World66 and Wikitravel which are, at the time of writing, the biggest free travel wikis on the net, and set up for a global audience. To rule out that differences between different regions of the

[12] This second study on the dimension of information timeliness was taken from: Aschoff, F.-R., Prestipino, M. & Schwabe, G. (2007). Cooperation technology and timeliness of information: Comparing travelbooks, wikis and online communities. Full Paper. Proceedings of the 15th European Conference on Information Systems (ECIS). St. Gallen, Switzerland, June 07-09, 2007.

[13] The Lonely Planet Travel Guide was published in Nov. 2005, the Moon Handbook was published in Oct. 2005. The evaluation took place in Aug./Sept. 2006

world would influence our sample, we confined the study to one popular country for independent travellers, namely Australia.

We collected 45 accommodations and 45 restaurants from each of these six media resulting in a total number of 540 information objects. In the case of travelbooks and wikis, these objects were chosen randomly. For travelbooks, a page number was drawn randomly and then from this page number, the next paragraph with accommodations was selected; from this group of accommodations, one object (like a hotel or youthhostel) was selected randomly again. For the wikis, a page covering Australia was randomly selected. If the page contained accommodations, one was selected randomly. For the forums, we took the perspective of a user who would use the keyword-based search with terms like "hotel" or "hostel" for the area of Australia. Then we selected the first 45 accommodations with price information. This same procedure was also carried out for the restaurants.

After the collection of the sample the information was checked by e-Mail, phone or web-pages of the respective accommodation or restaurant. Information on web-pages was only considered trustworthy if it clearly belonged to the respective institution and if clear dates were published in the time span that the prices were valid. In all cases of doubt the institutions were contacted by e-Mail or phone.

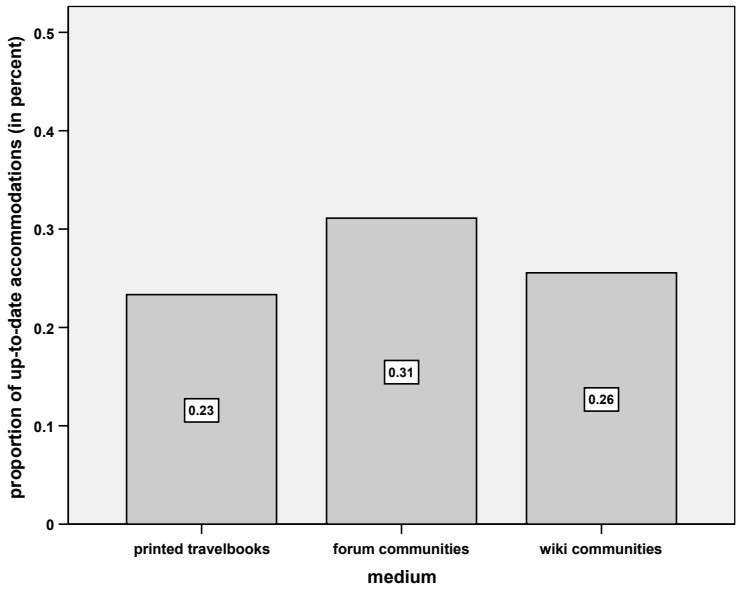

Figure 4.2.4: Proportion of up-to-date accommodations for the three media types

Figure 4.2.4 shows the proportion of up-to-date accommodation. All prices in the media which matched the actual prices were categorized as up-to-date, while all prices with deviations were categorized as not up-to-date. As predicted by our hypothesis, the forum communities show a higher percentage of up-to-date accommodation than the printed travelbooks. This difference, however, does not reach significance. A binary logistic regression over the three media types shows that the differences are not systematic (omnibus chi-square = 1.46, df = 2, p = .481). Other measures for accommodations, like the deviations of the actual prices from the prices in the media, show similar results.

The results for the restaurants correspond to a large extent to the results for accommodation on the level of the three media types. The percentage of up-to-date information is higher for all six media since the addresses and the names of restaurants change less often than the price of accommodation. Thus, five media (the travelbooks, the forums and one wiki) all had up-to-dateness values above 90% percent. No significant difference was found between these five media (log. regression: p = .68). However, there was one exception: the wiki community World66 reached only a level of 56% of up-to-date information objects. We believe that one person entered a number of restaurants when the wiki was started and the respective page had not been updated. This shows that the variance in communities is higher than in guidebooks. If the activity is low in certain areas of the wiki information happens to get out of the zone of attention and will not be updated.

While we did not find systematic differences between the three media types, there were interesting differences within the media itself, particularly between the two travel forums. This motivated us to look closer at the technical and social construction principles of the media. The next sections introduce a model of these construction principles and will use the model to show why the differences are currently insignificant and provide justification for why we propose that, in the long run, wikis will be the most up-to-date. In this discussion we include data on up-to-dateness of each individual medium.

4.2.9 Conceptualizing timeliness (refined approach)

We propose that there are three main factors which influence the timeliness of information in all three media:

General up-to-dateness of information in media = f (the initial up-to-dateness at the time the information is first made available to users, the speed at which the referred

information changes in a certain domain (volatility), the revision cycle of the information)

The overall up-to-dateness of an information item in a guidebook can be described by a zigzag-curve. With each revision cycle, the information up-to-dateness starts at a height determined by the initial up-to-dateness and then degrades with the volatility of the domain. The revision cycle determines when the item's up-to-dateness is again lifted to the initial level of up-to-dateness (see Figure 4.2.5). The next sections will further describe and decompose these factors. We use the traditional guidebook to introduce the factors and discuss the instantiations in forums and wikis in the hypothesis section.

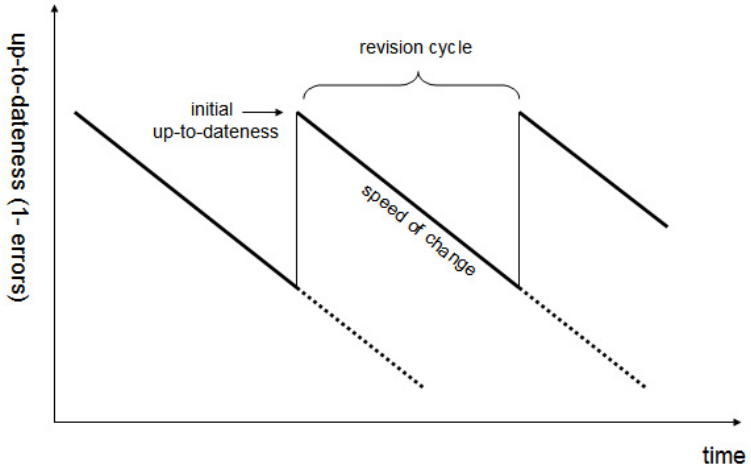

Figure 4.2.5: Up-to-dateness cycles of (traditional) media

The initial up-to-dateness at the time the information is available for the user

The initial up-to-dateness is a function of the quality of the information production process: The faster and more reliable that information is made available to the user, the more up-to-date the information will be. Thus, we propose:

Initial up-to-dateness = f (the quality of the observation of the source information, the speed of the externalization of the information, the publication speed)

The **quality of the observation of the source information** covers the capability of the author to collect true data. There are two general sources for out-of-dateness: the information is observed incorrectly (e.g., someone asks for an address and memorizes the wrong house number). In this case we have incorrect information from the start which would later appear to be outdated. Second, the information is not observed directly but is taken from an existing source, for example, an outdated webpage. In this case, the entire

life cycle from the original observation of this information would need to be added to the current process which would, of course, increase the probability of this information being outdated.

The **speed of the externalization of the information** refers to the time-span between the last observation until the information is put down for publication. In the case of a printed guidebook, this would be the time span from the inquiry by an author until the moment at which she delivers her page proofs to the publisher.

The **publication speed** refers to the time span between the externalization and the moment at which the information is available to the customer. In the case of the printed guidebooks, all efforts to lay-out, print and distribute the guidebook to the bookshops are within this time span.

The speed of change of the referred objects in a certain domain (volatility)

As pointed out above, the objects of different information categories, as well as their attributes, differ decisively with respect to up-to-dateness. Extreme examples would be weather conditions or the possibility to do a trip when a certain number of persons are needed. The probability of information being out of date after a certain time obviously increases with a rising speed of change in the source. The three media types presumably adjust to this effect by selecting information suitable for their revision cycle (i.e., a guidebook would not publish special offers of a restaurant since they would probably be outdated by the time of publication).

The revision cycle

The factor which counteracts the speed of change in the domain is the revision cycle of the medium. We argue that the revision cycle depends on three factors:

Length of the revision cycle of a medium = f (the flexibility of the medium, expected quality barriers, the activity potential)

The **flexibility of a medium** ("how easy can the medium be changed ?) refers to the effort an author has to apply to manipulate the information in the medium. The printed editions of travelbooks are rather inflexible since every change has to go through an elaborate and expensive process of editing and then the changed information has to be printed. The publisher himself can decide upon changes, but still depends on the edition cycle to see his revision realized. Thus, there are two factors influencing the flexibility of

a medium: technical constraints and economic constraints. While the new release of a guidebook after every relevant change in the domain might technically be possible, it would not be feasible from an economic point of view.

Expected quality barriers refer to the expectations of an author concerning the level of quality his delivered information must have in order to be accepted in the medium. This level of quality can refer to the thoroughness by which the information was researched (how certain an information supplier is that the information is correct) as well as to the level of refinement that the information has to have in order to be accepted (e.g., language, consistency, structure).

The **activity potential** describes how many contributions the sum of all users are willing to make. This depends on the popularity of the medium (determining the sum of all users), the incentives for contributing and the individual's willingness to contribute. The actual number of contributions will then be a function of the potential activity, the expected quality barriers and the flexibility of the medium. In the case of the guidebook, the activity level is mainly determined by the number of the professional authors and to some extent by the number of users who give written input.

Finally, the average up-to-dateness of an information item an average user receives when accessing information can be calculated as follows:

Up-to-dateness at user access time = initial up-to-dateness minus decrease of up-to-dateness due to outdating of information (du).

In the following calculation we assume that user access behaviour is stable over time. This assumption is plausible, as the demand for travel information is not determined by the offer, but rather by the desire to travel. In contrast to the purchase of other literature, travellers do not buy a travelbook because a new edition appears but because they plan to travel to a certain country. (du) can be calculated as follows for information items in guidebooks:

*du = 1/2 revision cycle in days*outdating per day due to domain volatility*

The calculation of the up-to-dateness of wikis is the same as for books on an item level. While in books all information items go through a revision at the same time, each wiki information item may be changed in isolation. The formula is the same for forums, but the calculation of the revision cycle is a little more complicated: Here the user has two ways of accessing information: 1. She can pose a question and receive the answer. In this case, she receives newly created information and thus the revision cycle is so fast (= the time, she waited for the answer), that it can be neglected. 2. Or she accesses the

information from the community archives, e.g., because she does not want to wait for the answer. The revision cycle of forums therefore is the probability that the user access the archives multiplied with the revision cycle of items in the archive. A revision cycle in a forum is the average time until a new thread provides the same information as a prior thread. Note, that our model does not cover the case, that an information item sought by a user is not available in a medium. This is an issue of completeness, not up-to-dateness.

4.2.10 Hypotheses – Study 2

This section presents hypotheses on the comparative up-to-dateness of printed guidebooks, wikis and forums which are deduced from our propositions in the previous section. We present hypotheses on three levels of detail with 1 representing the highest and 3 the lowest.

Table 4.2.4: Summary of the hypotheses (Numbers = rank order; 1: highest; 3: lowest Grey: dominating variable)

	Travelbook	wiki	forum
H0: Overall up-to-dateness (sum H0.1)	**2/3**	**1**	**2/3**[14]
H1: Initial up-to-dateness (sum H1.4)	**1**	**2**	**3**
H1.1: Quality of observation	1	2	3
H1.2: Speed of externalization	1	2	3
H1.3: Publication speed	3	1	1
H2: Revision Cycle (sum H2.4)	**3**	**2**	**1**
H2.1: Flexibility of the medium	3	2	1
H2.2: Quality barriers	1	2	3
H2.3: Activity potential	3	2	1

On a very general level, we reiterate why we think that wikis will have the best up-to-dateness – at least in the long run. As shown above, our empirical data does not yet support this hypothesis. On a medium level, we argue that the current comparatively good up-to-dateness of travelbooks depends on the initial up-to-dateness, and the comparatively good up-to-dateness of forums depends on the speed of revision. On a detailed level, we will argue that while publication speed is slowest in guidebooks, the

[14] depending on volatility

initial up-to-dateness is mainly determined by the quality of observation as well as the speed of externalization. Here, printed guidebooks are currently the best. The revision cycle is mainly determined by the activity level and the flexibility of the medium which, in turn, favors forums. We propose further that domain volatility is important for the choice of an appropriate medium, but is only a constant factor influencing all media in the same way. Table 4.2.4 summarizes the hypotheses. Thus, the information in a medium is depending on the initial up-to-dateness, the domain volatility and the revision rate. Our model can be reformulated as hypothesis H0:
H0: The information in a travel medium is the more up-to-date, the better the initial information is, the lower the domain volatility is and the higher the revision rate.

The next sections will decompose H0 and propose detailed factors determining initial up-to-dateness and revision rate. We will not decompose domain volatility into specific hypothesis, because we assume that it is equal for all three media. Those detailed factors are now sufficiently specific to formulate hypothesis that rank travelbooks, wikis, and forums. As electronic media are changing rapidly, the rankings are only valid for the foreseeable future. We will then strive to aggregate those rankings to a ranking of the three medias' initial up-to-dateness and revision rate and finally to the three medias summative up-to-dateness. As we have to make assumptions on the strength of the individual factors, the aggregated hypothesis does not claim to have the same validity as the detailed hypothesis.

Initial up-to-dateness
Based on our model we also propose:
H1: The initial information is the more up-to-date, the better the quality of observation is and the faster externalization and publication are.

The next sections will look at each of the factors determining initial up-to-dateness.
a) Quality of observation
In the case of printed guidebooks, the observation or the inquiry of travel information is done by professionals who follow a systematic plan. They have often had a long lasting working experience with the domain during the process of investigating information. Their activity is clearly focused on the observing and writing process, and having numerous errors can clearly be harmful for their professional reputation. Travellers who enter information into a wiki usually do not travel mainly to gather information, but it will often be a mixture of recreation, fun and education. Even though a certain peer

pressure should not be underestimated, users do not have to face personal consequences if the entered information is erroneous. Sometimes information might also be consciously gathered to be entered into a wiki. In a forum, however, the entering of information is query driven. A question is posted and users answer the question, often from memory. This will, in many cases, be information they did not gather with the intentional to pass it on to others. Therefore, we assume:

H1.1: The quality of observations is best in printed guidebooks, second best in wikis and worst in forums.

b) Speed of externalization

Since the publisher knows about the importance of his travel information being as up-to-date as possible, he will shorten the time between the inquiry of the information and the "ready for print" state. He will request his authors to deliver new information in as short a time period as possible before the new edition. In open virtual communities, information production is not managed and no deadlines have to be met, so the time between the observation and the entering of the information can be much longer. In discussion based forums, the speed of externalization is also heavily dependent on other users asking a question. Only then will the available knowledge of the community be externalized, which may be long after the observations have been made by the writers. Some users solve this situation by posting information that was not asked for in the forum (cf. Prestipino 2004). In a wiki, a user can immediately find an appropriate place to put his observed information, so the time of externalization is more dependent on his motivation. We conclude that:

H1.2: The Speed of externalization is highest in printed guidebooks, second best in wikis and worst in forum.

c) Publication speed

As pointed out, the publication speed is the time span between the moment when the information is ready to be printed or posted and the moment it is available to the intended audience. The printed guidebook is obviously much slower than the communities in this process since the books need to be printed and distributed. A typical forum or wiki software available on the internet will transmit content immediately to the server(s), where it will be published to users of the system.

H1.3: The publication speed is equally high in forums and wikis, and decisively lower in guidebooks.

The publication process of a book may take a few weeks or even months, while changes to wikis and forums happen instantaneously. However the externalization of knowledge in travel wikis and communities typically is one dimension longer (months to years) with currently observed user behaviour. Thus the information is most up-to-date when published by a guide-book. As forums require an external trigger (the question by another community member), externalization will even take longer than with wikis. A ranking of guidebooks as having the best initial up-to-dateness and forums having the worst is further supported by the rankings of the initial up-to-dateness. Thus, our summative hypothesis on initial up-to-dateness is:

H1.4: The dominant factors are quality of observation and speed of externalisation. Therefore, the overall initial up-do-dateness is highest in printed guidebooks and lowest in forums.

Revision cycle

From our model we conclude:

H2: The revision cycle of a travel medium is shorter, the more flexible the medium is, the lower the quality barriers are and the higher the activity potential of a medium is.

a) Flexibility of the medium

In a forum the space of information can be changed quite easily by posting or answering a natural language question. A wiki proposes higher barriers since it requires the use of a simple editing language. A guidebook can be changed only with considerable effort since a re-print of the entire book is necessary to update single information items. Therefore, we assume:

H2.1: The flexibility is highest in forums, second highest in wikis, and lowest in guidebooks.

b) Quality barriers

Queries for a forum can be posted in natural language and are usually held in a colloquial style. Thus, the effort for the reader to explicate his information need or his knowledge is comparably low. Wikis already have decisively higher standards. Information needs to be wrapped into a consistent text and requirements for formal and stylistic aspects of language are higher. Guidebooks whose financial success is also dependent on the quality of the information presentation need to follow even higher standards concerning these aspects. Therefore, we assume:

H2.2: The quality barriers are highest in guidebooks, second highest in wikis and lowest in forums.

While printed travelbooks may still be more popular than online communities, the incentive to make a contribution is clearly higher for communities. A contribution to a guidebook could be a letter to the editor. The consideration of this letter is uncertain, however, and the reader would have to wait until the next edition is published to see his proposition realized. In a wiki, a contribution is published and recognized by the community immediately. Thus, the social effect of a publication is experienced directly as well as feedback on the content. In forums, the immanent social reward is still bigger since a concrete query can be answered which establishes a closer social relationship between the members of the community. Thus, we assume:
H2.3: Forums have the greatest activity potential, wikis have the second greatest activity potential, and guidebooks are the media with least activity potential.

We accept that quality barriers will significantly influence the quantity of information entering a medium. But quality barriers are only important for information that reaches the barrier. There is comparatively little of it reaching a guidebook, as there is little incentive to enter information and the medium is inflexible. In the comparison of wikis and forums, we believe, the higher incentives to contribute to a forum are key. Thus our summative hypothesis on the revision cycle is:
H2.4: The dominant factors are activity and flexibility. Therefore, the overall revision cycle is shortest in forums and longest in printed guidebooks.

Assumption: Domain volatility

When analyzing and comparing up-to-dateness in different sources, it is important to take the volatility of information into account. Comparing sources using items with widely differing volatility may lead to distorted conclusions. As in the previous section, we used categories for tourism-related information, for example, accommodation information. We purport that volatility of information items of each category will be the same on average, and therefore we argue: *Information has different lifespans, but the volatility of information of any given category is the same in all three media.*

For an aggregation into a new overall hypothesis on up-to-dateness of travelbooks, wikis, and forums, we have to take the domain volatility into account: For stable information, the initial up-to-dateness is most important and thus guidebooks will be better than forums. The more volatile the domain is, the more important is the revision

cycle and thus forums will be more up-to-date. Forums have a significant draw-back in their initial-up-to-dateness; guidebooks are hampered by their long revision cycle. Wikis can combine the strengths of both media without their disadvantages. Thus, wikis should be most up-to-date. Thus we propose a revised version of our overall hypothesis from 2005 (as explained in the introductory section of this paper):
H0.1: The overall up-to-dateness is best in wikis. For volatile information, forums are second; for stable information, guidebooks are second.

As we know from section two, our current data does not support the overall advantages of any medium. Regarding wikis this may be explained by the fact that they are a new, still emerging travel medium. For forums, their structural qualities may be an explanation. The following section will look at those structural qualities in a more detailed analysis.

4.2.11 A second look at the empirical data – Study 2

We now present detailed data on the up-to-dateness of the individual media. Figure 4.2.6 shows the proportion of up-to-date information on accommodation prices. On a descriptive level, we see that the two guidebooks, Lonely Planet and Moon Handbook, are pretty close to each other, 22% and 24%, respectively; the forum communities, Thorn Tree and Virtual Tourist, vary decisively and significantly, 47% and 16%, respectively; and that the wikis, Wikitravel and World66, are quite homogeneous, 27% and 24%, respectively.

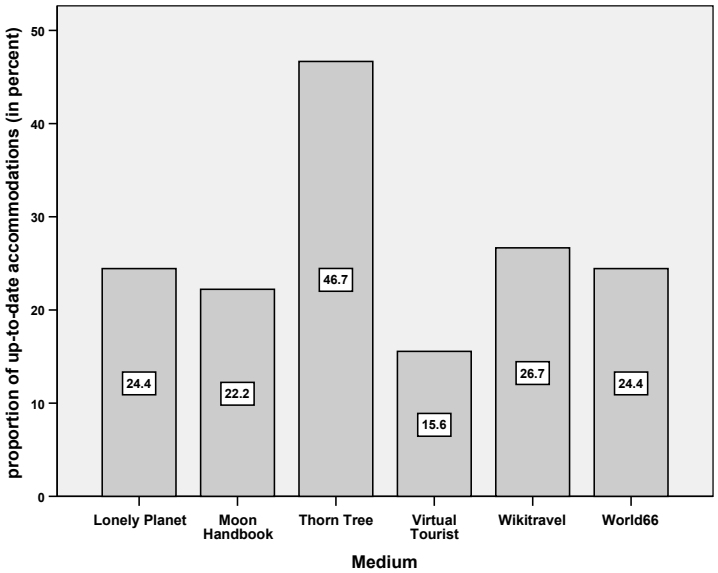

Figure 4.2.6: Proportion of up-to-date accommodations

The differences between the forums can be explained with the much faster revision cycle of information. While Thorn Tree had about 700 discussion threads per month during the observation period, virtual tourist had only about 150 discussion threads. We thus hypothesize that while the flexibility and the quality barriers are equal for both forums, the activity potential leads to a higher up-to-dateness of the Thorn Tree forum. The impact is so strong that it more than balances the initial up-to-dateness of the other media. The Thorn Tree is significantly more up-to-date than the average of the two wikis and the two travelbooks (log. regression: omnibus chi-square = 1.46, df = 1, $p < .05$). While the lower values for the Virtual Tourist forum do not reach significance (log. regression: $p = .18$) the data indicate that with a lower activity level (and thus a longer revision cycle), the lower initial-up-to-dateness can dominate the overall up-to-dateness.

4.2.11 Conclusions

Prestipino (2004) and Prestipino (2006) discussed technical differences and shortcomings of different technologies used by virtual communities. With the factors presented here, we posit that these technical shortcomings have clear implications for up-to-dateness. The time for externalization in a forum is dependent on someone asking questions, as there is no structure to put information into. Abandoned threads may still contain valuable, up to date information, but be mixed up with outdated information. They do not receive attention anymore by the community; thus, they are no longer the externalization of the community knowledge. As the typical way of searching a discussion archive is using a full-text search, very old information may be presented to the user. Wikis, on the other hand, require a high level of activity to keep information up-to date, as all information entered is preserved. This may explain the poor results for World66 in our empirical assessment, as it seems the wiki was initially filled with information acquired externally and then given to the community, resulting in the community being too small and not active enough to keep this amount of information up-to date. Wikis offer shared material but almost no communication support. It is difficult, if not impossible, to ask questions regarding new or individual information needs. Therefore, using just a wiki without discussion space does not take advantage of the community's capability to offer a powerful social interface to its currently available knowledge.

Lonely Planet's Thorn Tree forum keeps only a small archive of discussions, deleting most threads two months after they have been abandoned. While this does not solve structural problems of forums, and also means valuable information could be deleted, it certainly helps to reduce the number of different revisions and the age of the information in the medium. More specifically, the possible delay between the point in

time when information is entered into the system and the moment when it is retrieved by a user is reduced (cf. discussion of publication speed above).

So what is the most promising approach for a user looking for information in virtual communities? Based on our research, we conclude that it is best using wiki communities. Of course, the community should be highly active in terms of number of users and posts per day. A user should always try to observe information about when information was stored in the system and whether the authors reveal how old the provided information is. A user may view the changes recently made in the whole system to assess the activity level of the community. A check of some random pages will give a general impression about whether quality standards (e.g. good writing, coherent texts, good structure) are valued in the specific community. If no wiki is found, the next best strategy is to use a guide book for stable information and a forum for volatile information.

What do the different construction principles and observed user behaviour mean for the future of travel information? The following trends have to be taken into account:

1. The increasing popularity of communities will lead to shorter revision cycles both in forums and wikis, and thus lead to more up-to-date information in both media.

2. Internet-Cafes and the diffusion of mobile Internet-access and mobile devices increase the possibilities of authors to write while travelling. Both forums and wikis benefit from the faster externalization of knowledge and better quality of observation when travellers enter information while on site.

3. There is increasing up-to-dateness of information services on the web as information from institutional or other original information providers is directly linked in communities, instead of authors creating a copy of information that needs to be kept up-to-date.

These three trends will shorten the time frame, in which a guidebook is more up-to-date than community-based systems. If the time frame is too short, the current business model does not work any more and travellers will not rely any more on guidebooks for volatile information. Travelbook publishers will then have to concentrate on stable information and value added by other editorial work such as structuring information. There is, however, an increasing interest in commercial companies to leverage the potential of tourism communities. Even more than in Wikipedia, there is a high commercial interest in the “truth“ distributed by the media. Systematic manipulations (ranging from crude spamming of forums to sophisticated opinion-design by spin-doctors) may hinder or even prevent community based information systems from realizing their potential. Further

research is required to understand the role of speed of externalization in a wiki or forum community for initial up-to-dateness. How old is information on average when entered into the system? Likewise, as for the revision cycle, a better understanding of the activity potential is needed: a large community has a lot of readers, of whom only a fraction also writes.

From a systems design perspective, our findings confirm earlier propositions (Prestipino 2004; Prestipino 2006) that wikis and forums by themselves are not the definitive tools providing high quality. A combination of both technologies looks promising, and in the ideal case, there would be an integration of other community information systems (e.g., recommender systems) and personal spaces (Blogs). For discussion based communities, it is important to take into account that because of poor quality of observation and longer time for externalization, revision of information in a forum does not necessarily mean that old information is corrected or that more up-to-date information is introduced. Because of poor structure and an orientation towards discussion support, forums actually have several revisions of information visible at a time. While the aging and obsolescence in forums foster a shorter revision cycle, older threads, with a higher probability of containing outdated information, are still accessible. Also, the existence of old information in a forum or wiki does not imply that it is still up to date, as it may just not have been observed by anyone capable or willing to correct it. Because information production is not managed, a user has a certain degree of uncertainty about up-to-dateness of information presented to him in a wiki or forum. Because of the heterogeneity of up-to-dateness of information published even in recent discussions, it is difficult for a user to assess up-to-dateness. A system should provide data about how often an information has been viewed, and when it was retrieved the last time, to assess how up-to-date it might be. Providing users with data about the level of activity in a community could help them assess quality of information.

4.3 Conceptualizing and measuring the internal discourse quality[15]

After proposing the dimensions of completeness and timeliness, we will now turn to the inner discourse quality or inner "service" quality of our framework. It is modeled according to the rationale of what should be perceived as beneficial when users with communicational and/or informational needs interact with a forum. Our perspective also embeds the metaphor of online communities as information systems as proposed by Prestipino & Schwabe (2005) and Schwabe & Prestipino (2005). This approach takes the perspective of a community member with certain information needs. The relevant question in this regard is: How well does the community satisfy this information need? While our approach is based on this perspective and is reflected in our measures, we explicitly recognize the fact that online communities are not only question-answering platforms but also socializing platforms.

It is for this reason that we did not confine our concept to the aspect of "answer quality" but chose the more general concept of "discourse quality." This conceptualization accounts for the fact that initial posts do not necessarily have to be questions but can also be suggestions, recommendations or exclamations of any kind. Furthermore, a considerable share of communication in online forums is not directly related to knowledge exchange. An analytical restriction to question-answer pairs would therefore fail to fully grasp the communication pattern in these forum platforms. Thus, in a general sense, we take the perspective of a community member who sends a post to the forum.

One decision that had to be made within the course of this research was to choose an appropriate analysis unit. In accordance with Rourke et al. (1999), we defined a forum thread as our basic unit of analysis (see Figure 4.3.1). A thread always consists of one or more posts, and is always started by an initial post that can be either a question or a statement of any kind. This also holds for the replies (in the sense of "possible reactions"), which can be either answers to a question, a criticism about the question, making fun of or flaming the initial poster, or adding a completely off topic remark.

[15] This section is taken from: Aschoff, F.-R., Schaer, V. & Schwabe, G. (2011). Where should I send my post? The concept of discourse quality in online communities and its dependency on membership size. Proceedings of the 5th International Conference on Communities & Technologies (C&T 2011). Brisbane, Australia, June 29th - July 2nd, 2011. Slight Modifications were made.

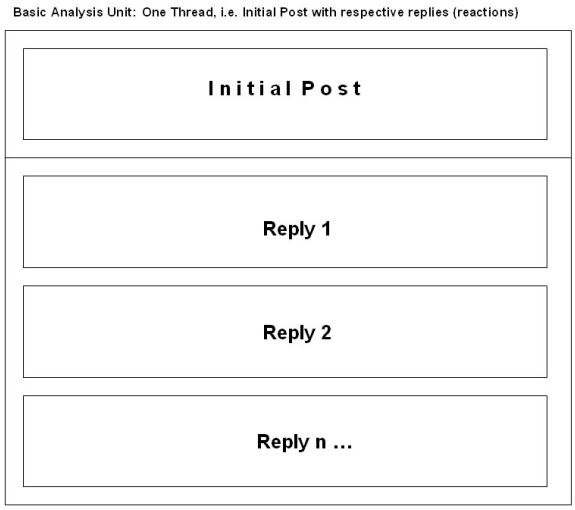

Figure 4.3.1: Our basic Analysis Unit: The Forum Thread

This analysis unit was conceived in accordance to Henri's (1992) definition of interactivity. According to her framework, not every thread guarantees interactivity, as there are some prerequisites that must be fulfilled. These are described as a three-step process of interactivity: communication of information, a first response to this information, and a second answer related to the first. Thus, we consider a thread as the meaning unit that represents the possible satisfaction of a communicational need from the perspective of the user. In relation to this basic analysis unit, we define discourse quality from the perspective of a forum member as a combination of quantitative and qualitative measures as follows (see Figure 4.3.2 for an overview):

Discourse quality = f (reply quantity, reply quality)
On a general level, we argue that discourse quality depends on the quantity and quality of the replies. This implies that more replies in a shorter time are an advantage, but only if the quality of these replies is on a certain level. In the following sections, we further elaborate on the measures of reply quantity and reply quality, and discuss the rationale behind these concepts.

Reply quantity = f (Probability to receive at least one reply, Waiting time until first reply is received, Total number of received replies, Total number of distinct repliers)
In addition to the total number of replies, we consider the probability to receive at least one reply as a separate measure. The rationale behind this conceptualization is that a

single correct reply can already fully satisfy the information need of the poster. Further replies underlie a possible effect of diminishing marginal returns, as every additional reply contains fewer added informational value than does the previous one. We also chose this conceptualization to distinguish between all initial posts that receive at least one reply and those that do not receive any replies at all. We consider the latter case a failed communicational act within a forum discourse. In addition, a shorter waiting time until the first reply is received, seems to be an obvious advantage for the poster. We expect this waiting time to be of increasing significance as more and more communities are accessed from mobile devices, and thus information needs might emerge more and more from onsite contexts.

Regarding the total number of replies, we argue that more replies are advantageous compared with fewer replies. This holds especially true for open questions such as, "What are some cheap but nice hotel rooms in London?" In addition, it can also be an advantage for factual questions, since subsequent replies might add crucial facts or, even more importantly, might correct previously given incorrect information. Finally, we include the number of distinct posters within a thread, arguing that a thread that includes more individual knowledge sources is superior to a thread with fewer sources.

We argue that these concepts also hold in the case where the initial post is not a question. If an initial poster sends a comment to the forum, we consider this a communicational act. We assume that this person also wants to trigger a reaction and engage in the community discourse. With this train of thought, it is logical to think that the availability of more replies in shorter time-spans driven by a greater number of different communicators is more attractive to the user. As we discuss below, all these assumptions hold only if the longer threads involved do not suffer from a systematic decline regarding the inner quality of their content.

Reply quality = f (Reply discipline, Communicational exchange pattern)

As already pointed out, a purely quantitative measure would fail to do justice to the overall concept of discourse quality. Therefore, we include two aspects of reply quality: the reply discipline and the more general concept of the communicational exchange pattern.

Reply discipline = f (Topical relationship of a post to the general topic of the community, Topical relationship of a reply to the initial post)

The reply discipline is divided into two concepts. The first is whether the post relates to the declared overall topic of the respective forum (e.g., does a post that is sent to a travel

community indeed cover a travel-related issue?). Incidences where this criterion is validated might include personal attacks (flaming or trolling), content with purely commercial interests (distracting off-topic advertisement) or other off-topic discussions (e.g., political debates that have no connection to travel issues). Secondly, we also considered the concept of the consistency of the thread propagation. To this end, we assessed whether the replies 1 to n still had a topical relationship to the initial post. To distinguish these two concepts, note that the initial post can be completely unrelated to the declared topic of the forum, while all following replies could still have a topical relationship to this initial post. This measure appears relevant since we assume that a possible information need of a community member is declared in the initial post. As soon as the incoming replies deviate from this information need the thread loses value for the submitter of the initial post.

Communicational exchange pattern = f (Kind of the initial post, Kind of the reply)
Finally, we consider the actual content of the communication within a thread. For this purpose, we distinguish between two basic categories: the initial post and the replies that are received. Regarding the initial post, the two main categories are whether it is a question or a comment. As for replies, we developed a content analytical category system consisting of 14 categories, including options such as "Explanation/Answer", "Follow-up Question", "Aggressive Behavior" or "Easy Talk that has no obvious informational value."

For these reply quality measures, we developed a codebook based on content analysis research methods. To measure the extent to which our codebook is reliably achieving the consistency required in content analysis, we calculated the intercoder (or interrater) agreement. To this aim, we compared the conclusions that independent coders reach when evaluating the same variables using a codebook. Two coders coded 20 identical threads for all variables contained in the codebook. Coding was done independently and without consultation or guidance. The number of concurrent answers is divided by the total number of possible answers in order to get the intercoder agreement. The results show an average agreement of .985 across all variables. This suggests that this codebook is adequate for examining the forum discourse qualitatively. The full description of our categories as well as the coding instructions can be found in Appendix A.

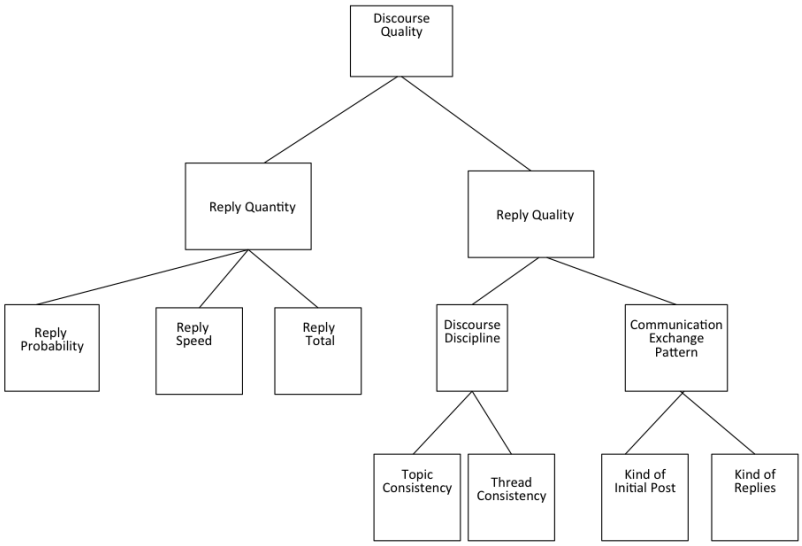

Figure 4.3.2: Components of the internal discourse quality measuring framework

4.3.2 Method

With this approach we followed two goals: Firstly, to provide benchmark values that allow to compare empirical results from other online communities. Secondly, we intended to provide systematic evidence for the activity-quality assumptions that emerged in post-hoc analysis of the studies regarding information completeness and timeliness. We intended to make a connection between the number of members and the resulting discourse quality. In this section, we will first report the results of obtaining our benchmark values. The empirical findings regarding the activity-quality assumption will be reported in Section 5 on exploratory studies. In the subsequent section, we will described the method we used to obtain the data for both studies.

Sample

To empirically investigate the relationship between membership size and discourse quality, we sampled a number of online forums in the tourism domain, resulting in 34 communities. For these forums, we monitored the number of members online for the period of about eight weeks, from May 18 until July 12, 2009. We then randomly

sampled 15 threads (wherever available) and analyzed these threads using our discourse quality conceptualization.

Sampling communities and monitoring activity measures over time. We conducted a general search for online travel forums to gain a comprehensive sample. For this first sample we used the following criteria:

1) The platforms had to be classical forums realizing the threaded question-answer structure typical for forum communication (thus excluding travel wikis or newer community types such as social networks).
2) The main purpose or one of the main purposes of the forum had to be travel-related information exchange. The forum members had to discuss typical travel-related topics (e.g., how do I find a certain place? What are suggestions for travel-related behavior? What are attractive things to see or do in a certain region?) We also included forums from related areas (for example, surfing) if these communities had a considerably large sub-category that dealt with travel-related aspects (traveling and surfing).
3) All communities had to be English speaking.
For this search, we used the following search engines: Google, Yahoo!, Altavista, Live Search by Microsoft, the meta-search engine Mamma as well as Boardreader. Keywords used include: "Travel Forum", "Traveler Forum", "Travel Board", "Independent Traveler Forum", "Independent Traveler" and "vbulletin travel."

The initial search results comprised of a total number of 120 travel communities. Most community platforms publish the total amount of users online, registered members online, as well as guests online. In most cases, guests are users that have access to read the threads but are not allowed to ask or answer questions. These activities are usually exclusively granted to registered members. A few forums allowed unregistered guests to ask or answer questions, which we excluded from our sample. We programmed an automatic script that read out the number of registered members online four times a day in a six hour interval. The following analysis covered an eight week period from May 18 to July 12 in 2009.

We also excluded from our sample those communities that were severely spammed during our analysis interval. In addition, we chose to analyze only those forums with more than 80% valid measurements during our period of analysis. At the end, our sample over the eight week data collection period consisted of 42 travel-related online communities.

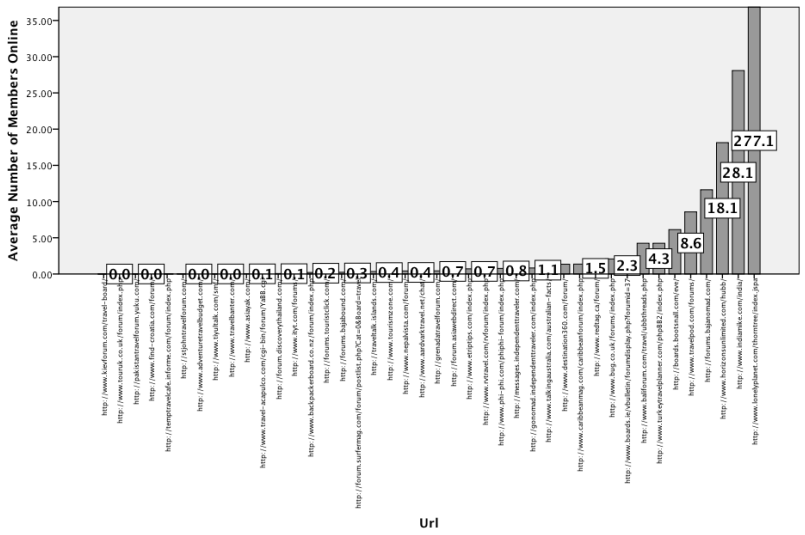

Figure 4.3.3: The mean number of members online for 42 travel communities

To obtain the average activity level of these 42 communities, we calculated the average number of members online over the entire analysis interval (4 measurements a day * 56 days = 224 measure points). Figure 4.3.3 shows the communities as well as the mean number of members online. The figure shows that the community landscape is characterized by a "long tail" distribution. Comparably few communities with a very active member base are accompanied by a large number of communities with only small activity levels.

Sampling of the threads. We conducted our analysis selecting 15 threads from each of these 42 forums. Since we were interested in travel-related communication, we sampled these threads from community sub-areas that dealt with travel related topics (usually the main area of the forum). We did not consider more remote areas of the forums that dealt with technical questions about the use of the forum, general feedback about the forum or categories that were clearly marked as not being mainly travel-related (e.g., How to buy property for persons who would like to immigrate to a certain country).

The selection of every individual thread was based on a randomized procedure. Using a random-number generator, we selected one of the pre-defined subcategories, which had been manually numbered from 1 to n. If there were more subcategories on the next level, we repeated this random selection until we got to the thread level. We then generated a random time and date between May18 and July 12, 2009. From this randomly

chosen point in time, we selected the next thread we could find in this time interval. Thus, we only chose threads that started (i.e., had their initial posts) during our analysis period. Even though we used a duration period of about eight weeks, some of the communities had such small member activity that they did not have a total of 15 threads in the entire time interval. We thus included only those forums in our final sample that had at least 5 threads, resulting in a total of 34 forum communities (27 having 15 threads and the remaining 7 having at least 5 threads). We then applied our coding scheme to these forum threads for a total of 469 threads and 1772 posts.

4.3.3 Constructing a discourse quality scale – benchmark values[16]

In this part, we will take the described sample as norming sample to construct a discourse quality scale for communities. Our scale will have five categories reaching from poor, below average, average, above average to excellent (see Figure 4.3.4). We will now demonstrate the approach by reporting the benchmark values of selected attributes of our discourse quality framework.

Figure 4.3.4: The category schema for our discourse quality benchmark values

Reply probability

Figure 4.3.5 shows a histogram of the average probability to receive at least one reply for the 34 communities in our sample. The average reply probability for our sample is 65%. Three Communities have an answer percentage between 90 and 100 percent whereas two actually reach the 100% mark, i.e. every initial post received in our sample received at least one reply.

[16] This section about benchmark values is based on the data that has been collected for Aschoff et al. (2011). The following data analysis, however, has not been published before.

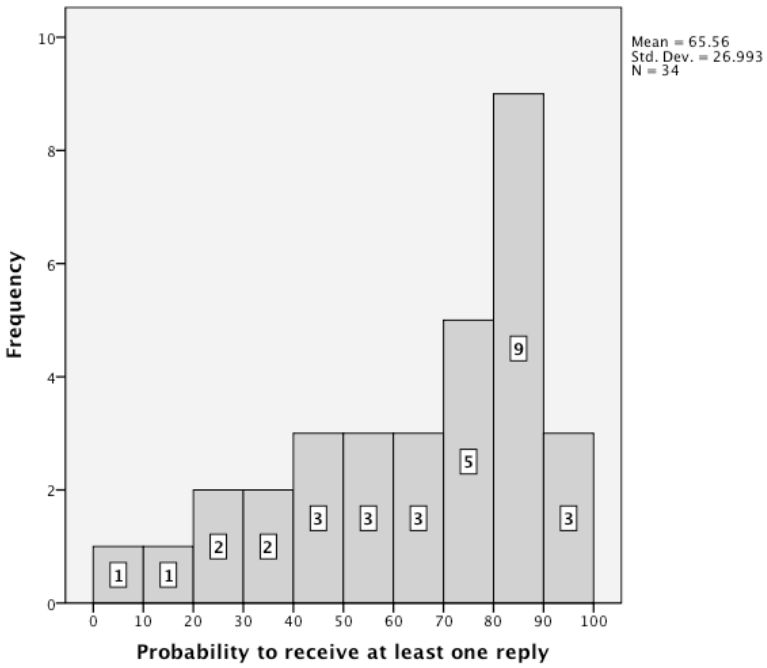

Figure 4.3.5: Histogram of our community sample showing the probability to receive at least one reply

To norm our discourse quality scale for reply probability, we took the cumulative percentages of our reply probability distribution and divided them into five equal groups. Figure 4.3.6 shows the resulting cut points for these five groups.

exceedingly below average	below average	average	above average	exceedingly above average
1%-40%	40%-67%	67%-80%	80%-87%	87%-100%

Figure 4.3.6: Benchmark values for reply probability in online (travel) communities

Total number of replies

Figure 4.3.7 shows a histogram of the average number of replies per thread for the 34 communities in our sample. We see that more than 50% of our communities (21) receive an average number of replies per thread between 0 and 3. Nine receive an average between 3 and 5 replies while a small group of four communities receives an average between 6 and 7 replies per thread. The overall average amounts to 2.6 replies per thread. Figure 4.3.8 shows the mapping of the total answer distribution to our scale.

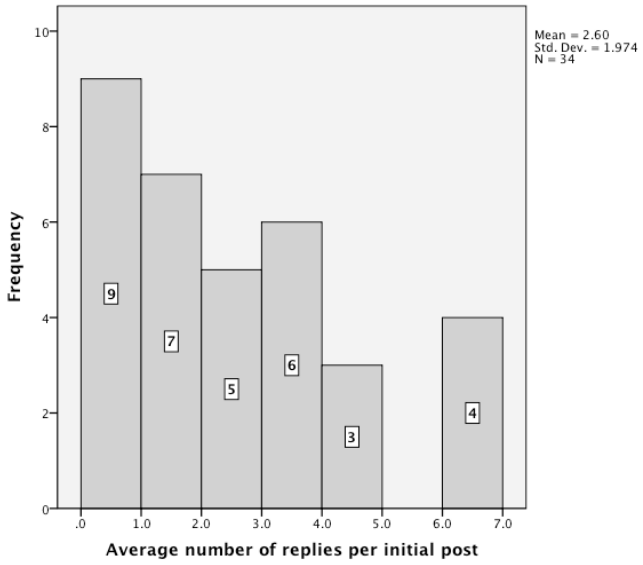

Figure 4.3.7: Histogram of the average number of replies per initial post for our community sample

exceedingly below average	below average	average	above average	exceedingly above average
0-0.5	0.5 - 1.5	1.5 - 2.9	2.9 - 4.1	4.1 +

Figure 4.3.8: Benchmark values for average number of replies per initial post in online (travel) communities

Waiting time

Figure 4.3.9 shows a histogram of the average time between the initial post and the first reply for 32 communities in hours (for two communities we were not able to record this data). Figure 4.3.9a shows all 32 communities, while Figure 4.3.9b shows those communities that are below 200 hours. We see that six communities have an average reply time under 20 hours (i.e. within one day), while additional 15 have an average reply time under 200 hours (i.e., a bit more than a week). Figure 4.3.10 shows the benchmark values for the average reply time.

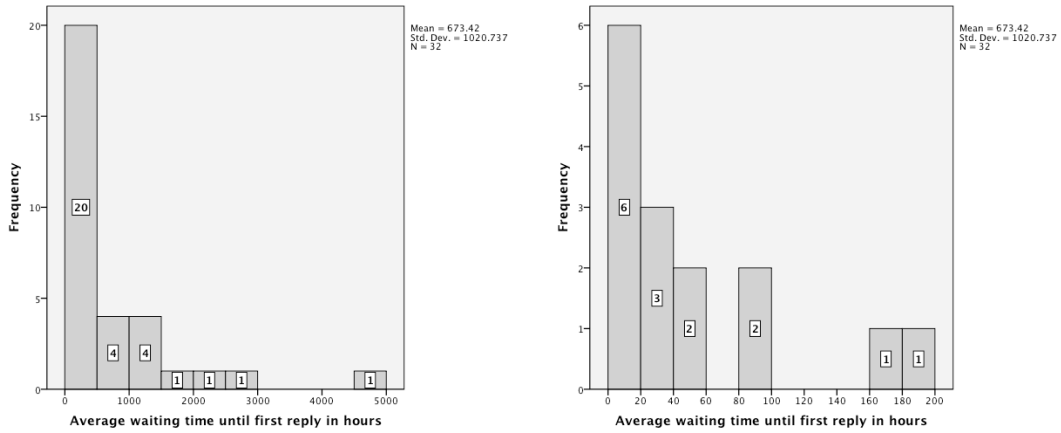

Figure 4.3.9: Histogram of the average waiting time for the first reply in hours

exceedingly below average	below average	average	above average	exceedingly above average
1147 h +	446 – 1147 h	104 – 446 h	23 -104 h	0 – 23 h

Figure 4.3.10: Benchmark values for average waiting time in online (travel) communities

Discourse discipline

Relationship with traveling topic

Figure 4.3.11 shows a histogram of the percentage of posts that were classified as On-Topic for the 34 communities in our sample. The data show that the majority of these travel communities have a good discourse discipline, i.e. members mostly stick to the topic of travel-related issues. The average percentage of On-Topic posts is 80.65%. Figure 4.3.12 shows the benchmark values that resulted from our sample.

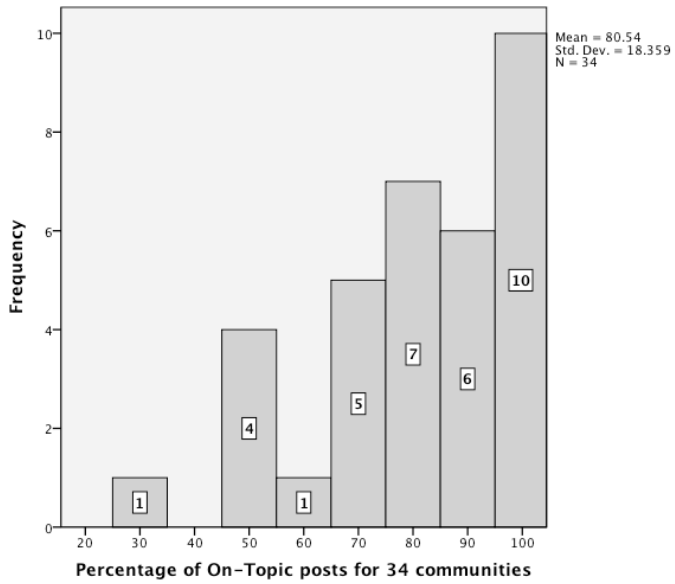

Figure 4.3.11: Histogram of the percentage of On-Topic Posts for our community sample

exceedingly below average	below average	average	above average	exceedingly above average
1%-66%	66%-81%	81%-91%	91%-99%	99%-100%

Figure 4.3.12: Benchmark values for On-Topic posts for online (travel) communities

Thread consistency

Figure 4.3.13 shows the percentage of replies that are connected to the initial post for the 34 communities in our sample. The data shows a similar picture like the relationship with the traveling topic. The vast majority of the posts is connected to the initial post while posts that diverge from the topic of the initial post are only rare. For 16 communities, between 80% and 100% percent of the posts are connected to the initial post. Only three communities show a percentage of connected posts that is below 50%. Figure 4.3.14 shows the respective benchmark values for thread consistency.

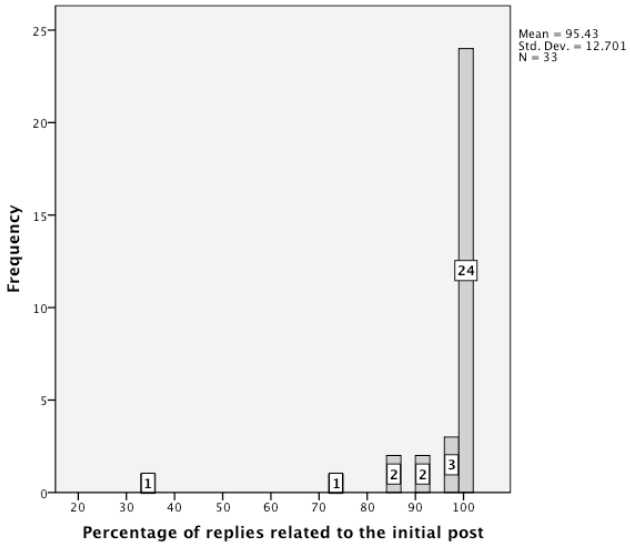

Figure 4.3.13: Histogram of the percentage of replies that are connected to the initial post

exceedingly below average	below average	average	above average	exceedingly above average
1%-66%	67%-81%	82%-91%	92%-99%	99%-100%

Figure 4.3.14: Benchmark values for thread consistency

Kind of initial post

Figure 4.3.15 shows the percentage of initial posts that are questions. The remaining posts are comments. The data show that only 54% of all initial posts in our sample are questions. All other initial posts are comments that are sent into the community without stating a clear information need. This data underline that domain related virtual communities like travel communities are not merely question answer systems but rather discourse spaces where one reacts to the utterances of the other. Since there is no valence whether the initial post is a question or not we did not calculate benchmark values for the kind of the initial post.

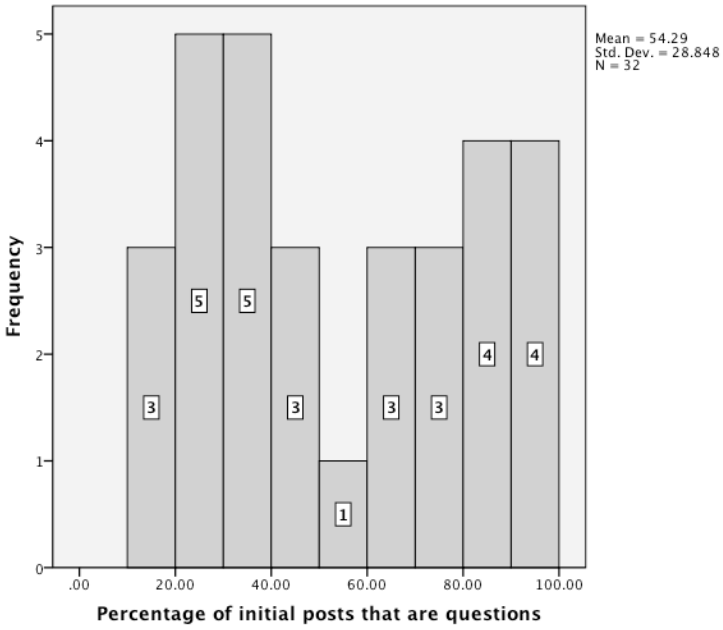

Figure 4.3.15: Histogram of the percentage of initial posts that are questions (the remaining posts are comments)

Kind of replies

Figure 4.3.16 shows the average percentages for kind or replies for the 34 communities in our sample. Blue colours show kind or replies that are mainly related to an information exchange. Green colours show kind of replies that mainly related to socializing activities. The red colour shows kind of replies with an unfriendly attitude and a lack of respect. The Figure shows that the biggest part of the replies are answers or explanations targeting information needs (56%). The next biggest share, however, is already a kind of "easy talk" or chit-chat, i.e. social-oriented communication without obvious informational benefit (26%). Thanking, Humour and Emotional Support each account for 10 to 15%. These shares are followed by confirmation, archival, clarification and follow-up question that account for 5 to 10%. One category in our code book has a clearly negative connotion. This category is called "Unfriendly Attitude" and includes personal insults, flaming, troll behavior etc. In our sample this category only accounts for 4% indicating that the overall communication can be described as mostly constructive and supportive.

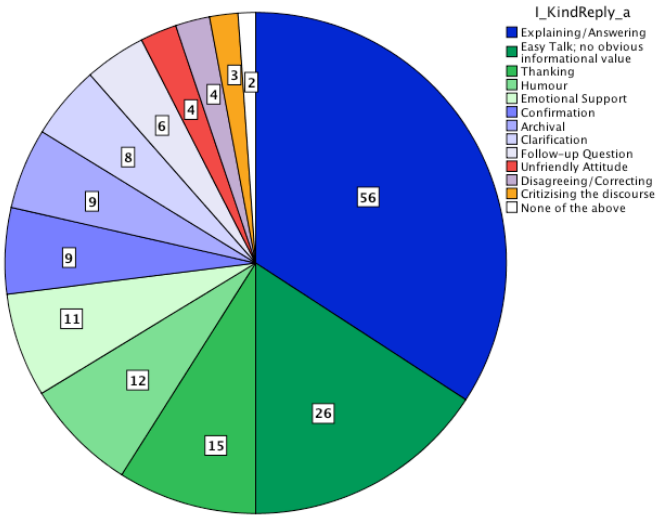

Figure 4.3.16: Average percentages for kind of replies for the 34 communities in our sample

4.3.4 Discussion and conclusion

The results of our analysis shows that there is a considerable variance regarding internal discourse quality among the travel communities in our sample. However, we also see that there is a large share of communities that offer a very convincing level of discourse quality. In addition to the question of on-topic and off-topic posts, we also analyzed the degree to which the replies in a thread are related to the initial post. This analysis showed similar results as the on-topic/off-topic posts: The large majority of posts in our analysed thread are meaningfully related to the initial post. An analysis of the kind of replies revealed that most of these replies were answers/explanations that showed the intention to satisfy the information need of the initial poster. Problematic posts, like e.g. personal insults or posts that would hamper the conversation by off-topic distractions were only found to a very small percentage. Thus, we can report that while there are individual differences between communities, the overall discourse quality in our sample was high. Problematic behavior like disrespectful behavior or the misuse of social platform for other purposes (like e.g. sexual content) that is sometimes reported from other web platforms does not seem to be a crucial problem in our sample.

For further research steps, we would consider possibilities to automatize the manual coding of these categories (e.g. by automatic essay grading or machine learning approaches). This would allow to apply our framework to a large number of communities with larger sample sizes. An additional question would be how different online travel

communities can be classified regarding online discourse quality. This approach could include questions like: Are recommendable communities consistently high on all our variables or do the show particular weaknesses? Is it possible to systematically divide the online community landscape into different quality areas (possibly those that focus more on quantitative measures and those that focus more on qualitative ones)?

V) EXPLORING THE ONLINE TRAVEL COMMUNITY LANDSCAPE AND INFLUENCING FACTORS ON DISCOURSE QUALITY

5.1 Exploring the landscape of online travel communities

In Section 4, we proposed a framework to measure discourse quality in online communities. This framework allows the systematic comparison of multiple online communities that are available on the Web. It can be used to recommend communities with good quality to users and it can be used for further theoretically based research regarding the discourse quality in online communities.

The research perspective of comparing multiple online communities among each other is fairly new. Most research that targeted online communities, so far, took one or few online communities as object of research and investigated how these online communities could be developed (e.g. Preece 2000; Kim 2000) or how community members interacted with this community. This research approach might have been justified during the 1980 and 90ies when only few online communities were available on the Web. During these times, the aspect of social relationships among users were the focus of the research attention because it was a new phenomenon that people could socialize in a merely virtual space.

Today, however, the Web user has the chance to choose among numerous online communities for every domain and the question of how he can make a good choice in this situation has hardly been a research issue, yet. With our framework, we provided a tool that made it possible to systematically compare different online communities. However, an insightful research approach that compares online communities requires a basic understanding of the phenomenon of interest. Online communities do not exist isolated but are part of the socio-technological ecosphere of the Web. An insightful research of discourse quality as well as the aspect how member activity influences this variable, therefore, requires a thorough understanding of the online community landscape – not just of single communities. Therefore, we choose to undertake a number of exploratory studies to understand the dynamics of this landscape. This subsection will present the result of two empirical studies that collected data on numerous online communities to understand the characteristics of the travel community landscape.

5.1.1 The evolution of online communities[17]

As already discussed, online communities have been the object of extensive research within the last 25 years (for an overview see Preece 2000; for a multi-disciplinary topology Porter 2004). Within these decades of research the phenomenon has been highlighted from different perspectives. One commonly cited source is Rheingold (1993) who describes online communities as technological enablers for communication among community members. The social interaction is the focus of the author's attention and the mutual support (e.g. in case of illnesses) is vividly described. Hagel & Armstrong (1997) in contrast, focus on the economic potential online communities offer to companies. The authors see them as platforms to redefine and strengthen a company's relationship to customers, suppliers, and competitors. From the customer's point of view, Hagel & Armstrong (1997) conceive communities as the option to be a more informed bargainer than in traditional markets. For the domain of tourism see Wang et al. (2002) who take the more social perspective by Preece as well as the economic perspective by Hagel & Armstrong to discuss implications for marketing and design of travel communities.

These two perspectives are reflected by approaches for the construction of communities as well. Preece (2000) proposes a community-centered approach which is related to a member or user-centered approach. In accordance with a participatory-design approach Preece claims user needs and social aspects to be crucial pillars for the development of a community (another practical guide on community development is provided by Kim (2000)). Hagel & Armstrong (1997), again, conceive community members more as potential customers. They claim that communities fulfil four basic needs: interest, relationship, fantasy and the need for transaction and bartering (like e.g. purchasing goods). In accordance with this potential-customer perspective their development strategies focus on binding the members to the community. Consequently, their strategy to reach a community's critical mass point comprises three stages: generating user traffic, concentrating traffic and locking in traffic.

Just like Hagel & Armstrong (1997) and Hummel & Lechner (2002), we also conceive Online Communities as phenomena that realize network effects. This implies that the benefit users receive from using a product or a virtual community is influenced by the number of persons who also use this service or product. For most communication products within networks like traditional telephone networks it is the case that the

[17] This section is taken from: Aschoff, F.-R. & Schwabe, G. (2009). On the evolution of online tourism communities. Research-in-Progress. Proceedings of the 17th European Conference on Information Systems (ECIS). Verona, Italy, June 8-10, 2009. Slight modifications have been made.

personal benefit increases with a rising number of other persons who also use the network (cf. Shapiro & Varian 1999). Crucial aspects of a networks' evolution is the fact that they can evoke positive as well as negative feedback loops and that they follow an S-shaped curve in three phases: a) flat during launch, b) a steep rise during take-off as positive feedback kicks in and c) leveling off as saturation is reached (ibd.). Figure 5.1.1 depicts the assumed growth curve of virtual communities based on this network effect assumption.

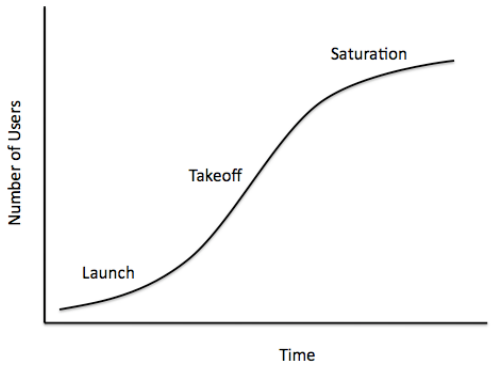

Figure 5.1.1: Assumed growth curve of online communities due to network effects (cf. Shapiro & Varian 1999)

From a practitioners point of view it is relevant to know at which number of users the accelerated growth curve starts for a specific community. If a common point or interval could be estimated for a specific community domain, it would be possible to predict the growth of different communities within the near future.

In accordance with this idea of a network market, virtual communities within one domain (e.g. English-speaking forums covering travel-related questions) cannot be considered to be independent from each other. Traditional off-line communities are to a strong degree bound to geographical aspects as well as aspects of affiliation. This means that originally one did not choose a community but one was born into one. Geographical boundaries as well as barriers between social classes were difficult to transgress. Even though this has changed to some degree since the industrial revolution, off-line communities are still rather a fate than a choice. This situation is considerably altered by the net situation: It provides the real choice to become a member of one community or the other.

This, however, implies that forum communities within one confined domain can be said to compete for users like products on a market compete for customers. From a neutral users' point of view it should always be more beneficial to join a community that has at least reached the take-off phase. If one community within a domain reaches this point, this would on principle be a good precondition for a monopolistic development. Wikipedia seems to be an interesting example of this situation. Only one main Wikipedia platform has developed up to now, even though some of the described topics on this platform are highly controversial. The positive network effects are so strong that users do not seem to be willing to launch competing knowledge sharing platforms. Figure 5.1.2 shows this division into winners and looser in a network market. Winners are said to enter a virtuous cycle while loser are said to enter a vicious cycle (Shapiro & Varian, 1999).

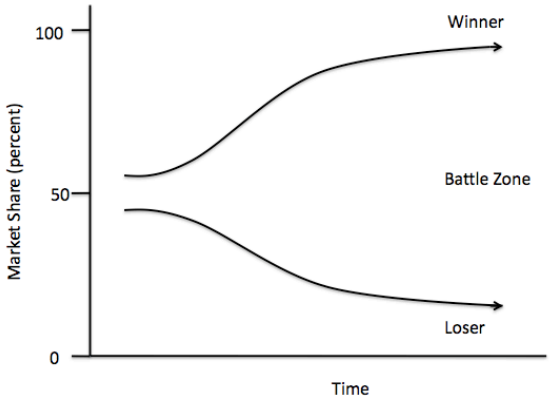

Figure 5.1.2: Separation of Winners and Losers in a network market (cf. Shapiro & Varian 1999)

Thus, a market with strong network effect tends to produce clear winners that are able to gain big revenues as well as clear losers that are not able to reach the positive feedback zone. This creates a situation in which a company either has to gain considerable amounts of the market share or will seize to exist.

In contrast to this situation, we see the conception of a long tail market as described by Anderson (2006). In these markets, products can be profitable in very small niches due to the decreased costs of warehousing and distribution in the digital economy (for a description of a long tail market for the business of online bookselling see Brynjolfsson et al. 2003). In these markets, the aggregated revenue from all the products that sell only in small numbers can equal or exceed the few hit products that sell in vast

amounts. Thus, from an economic perspective it pays off to offer niche products for a small customer segment as long as the distribution costs are minuscule.

A market can show network effects as well as a long tail distribution. The characteristics of this market will, however, depend on how dominant either of these influences are. A market that is dominated by network effects will, as described above, favour one winner and one or more losers. This is especially given when systems or products are incompatible with each other, i.e. the user of one system cannot communicate with the user of another system. This can eventual lead to format wars (e.g. the recent competition between the HD DVD and the Blue-Ray format; for numerous additional examples see Katz & Shapiro 1994). In contrast to this, a long tail market allows products with far smaller consumer than the hit products to be "economically sustainable". For a related controversy that contrasts a long-tail assumption that favours "underdogs" with a head-of-the tail assumption that favours "superstars" refer to Elberse & Oberholzer-Gee (2008). Applied to the market of online communities these perspectives lead to different predictions:

a) *The network effect perspective would predict a winner-takes-it-all market, i.e. few large online communities with considerable growth rates are accompanied by a number of small communities with stagnating or declining growth.*
b) *The long tail perspective would predict small communities in the tail to be successful as well, i.e. they would show user activity and growth rates.*

5.1.2 Empirical Method – Study 1

To empirically test these two assumptions, we assembled a comprehensive collection of online communities that dealt with travel-related questions. This search started in February 2008 and we only selected platforms that met the following characteristics:

a) In this research, we focussed on classical online forum platforms. These forums are characterized by a communicational structure in which one community member starts a thread by sending an initial post (like a question) and possibly receives a number of replies. In contrast to wikis, product recommendation sites or newer social networking platforms (like e.g. www.facebook.com), these online forums have been developing on the Internet for more than 20 years. By now they cover a wide area of topics including cooking, health-related issues, computer problems or mobile phone technology. For an early account of the online forum

community "The Well" founded in 1985 refer to Rheingold (1993). To obtain a more homogeneous sample, we confined our sample to browser-based forums.

b) The main purpose of the forum had to be travel-related information exchange. Prominent examples are the Thorn Tree forum[18] run by the Lonely Planet Publisher Group or the Virtual Tourist platform[19]. The forum members had to discuss typical travel related topics (like e.g. How do I get to a certain place? How can I solve travel related problems? What are suggestions for attractive travel routes or locations? etc.).
c) The language used by the community member to communicate had to be English.

The following search engines were used for this research: Google, Yahoo!, Altavista, Live Search by Microsoft as well as the meta search engine Mamma. In addition Boardreader was used which is a search engine specialized on finding online forums. The used key words comprised: "Travel Forum", "Traveler Forum", "Travel Board", "Independent Traveler Forum", "Independent Traveler" and "vbulletin travel".

The number of registered members was registered at two measure points. The first measure point was between February and July 2008 and the second measure point was in November 2008. The number of registered users was measured by reading out the respective number from the websites of the communities.

5.1.3 Results – Study 1

The described search procedure resulted in 120 travel-related online discussion forums. The first measure point was between February and July 2008 and the second measure point was in November 2008. The number of the community members is not displayed by all communities and some communities seized to exist or were temporarily offline at one of the two measure points. In addition to this, two communities were so massively spammed at the time of the second measure point that travel related communication was hardly taking place anymore. We excluded these forums from the sample. Finally, we were able to measure 74 online communities at two points in time. Figure 5.1.3 shows the 74 communities with their respective numbers of member at the second measure point in November 2008.

[18] http://www.lonelyplanet.com/thorntree/index.jspa

[19] http://forum.virtualtourist.com/

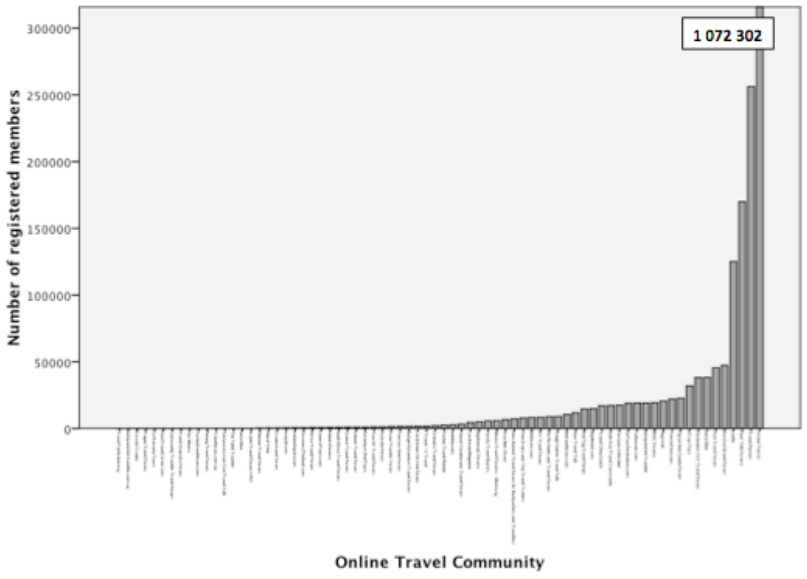

Figure 5.1.3: Number of registered members at the second measure point (Nov. 2008) for each forum

The distribution of the absolute numbers of registered members shows an archetypical long tail for this community sample. Based on this distribution we can roughly distinguish three groups of communities that are separated from each other by about one order of magnitude. We have one community which claims to have more than 1000 000 registered members. The second group consists of three communities between 100 000 and 300 000 members. The third groups starts with communities with about 50 000 registered members and entails 70 communities whereas the smallest communities only have between 10 and 20 members. The data shows that those forums above 50 000 constitute only about 5% of the forums in the sample. One the other hand, note that the forum with the highest acclaimed number of members already has more members than all the remaining forum communities.

We calculated the absolute growth rates of registered members as well as the growth rates relative to the absolute number of registered members at the first measure point for each community per month. Overall, communities in our sample grew by an absolute average of 393 members per month which relates to a relative monthly growth of 17.7%. The absolute growth rate of the largest community with about 1000 000 members amounted to 8085 members per month (0.78%). The second group between 100 000 and 300 000 members had two forums with only marginal or even negative monthly growth (924.5 members (0.76%) and -1155.2 members (-0.66%). The third forum in this

group, however, showed a considerable growth rate with 14267.56 additional members per month (11.16%).

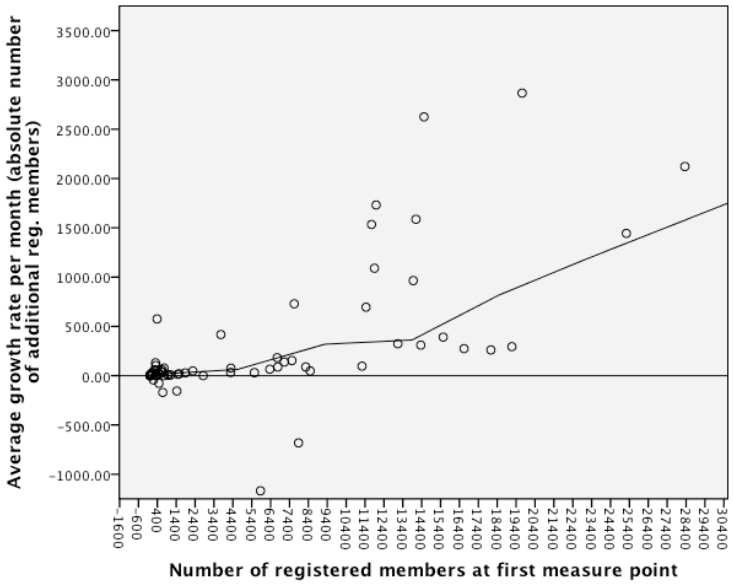

Figure 5.1.4: Absolute monthly growth rates for communities under 30 000 members

Figure 5.1.4 shows the absolute growth rates per month of communities below 30 000 registered members. The Loess fit line (Epanechnikov-Kernel with 50% of points to fit, entire sample included) indicates a steady increase in the absolute number of new members per month with considerable derivations. Overall, the absolute increase of members correlates significantly with the size of the community at the first measure point (Pearson = .336). This part of the sample consists of 70 communities out of which 62 communities show a positive growth level while 8 communities show zero growth or a negative growth level. The average growth level of these communities amounts to 17.66% (7.56% without one extremely fast growing community).

Thus, while this tendency is hard to prove due to the small number of communities at the head of the long tail, this data may indicate a certain saturation point. Overall we see a clear tendency that the biggest relative growth does not happen in the head of the curve but in the tail. Figure 5.1.5a shows these relative growth values for the range between 0 and 5 000 members. Figure 5b shows the range between 5 000 and 30 000 members.

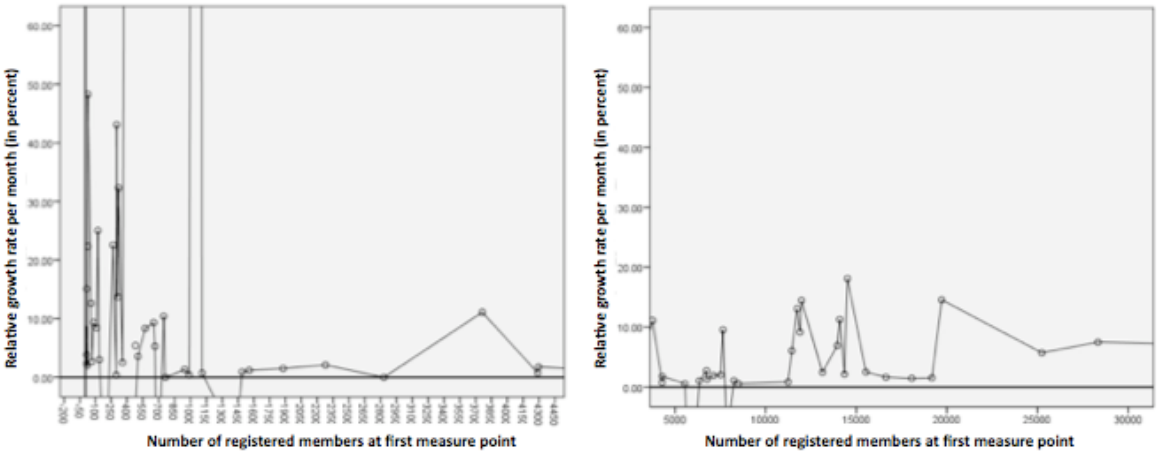

Figure 5.1.5 a/b. Relative growth rates with respect to the absolute numbers of registered members (in percent)

Again, the data show a considerable variance among the different forums. Most of the forums grow between 1 and 20%. A notable high number of forums show increased growth rates in the interval between 0 and 500 members. The relative growth rates of small forums have to be interpreted carefully. Just like with the economic growth rates of countries, one has to realize that a certain relative growth level can more easily be achieved from a smaller absolute baseline. A comparison of the absolute growth levels, however, shows that a number of smaller forums also show absolute growth rates that are comparable to the forums in the head of the distribution. To gain insights into the considerably high growth level at the end of the long tail we categorized our community sample into different subsamples.

What grows in the long tail?

As mentioned we see an archetypical long tail with very few communities with exceedingly high numbers alongside a vast amount of communities with only few members. Figure 6 shows the number of communities at the very end of the long tail only depicting communities with less than 10 000 members.

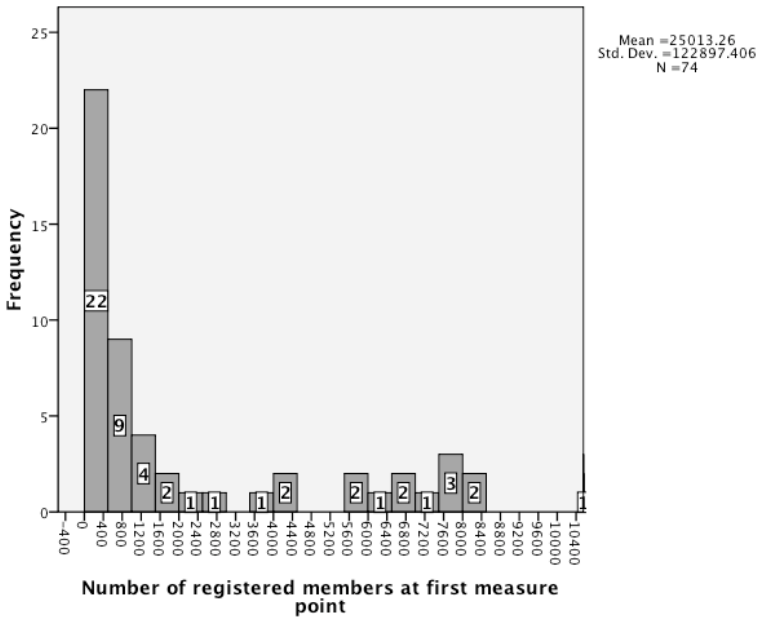

Figure 5.1.6. Frequency histogram for communities with less than 10 000 members

Note that 53 communities fall into the range between 0 and 10 000 community members. This is already 72% of the entire community sample whereas the largest communities have more than 100 000 members. In addition, the interval with the most communities within this range lies between 0 and 500. The network effect approach as well as the long tail approach would expect a diversification of the communities at the end of the tail. From a user perspective a community in the tail should provide some special good that cannot be offered by the big communities. Only based on the probability to obtain good answers to posted questions or the chance to meet many new people, the larger communities should always be in advantage of gaining new users. To test this assumption we divided our sample into three groups. The first group of communities are communities that on principal cover all regions of the globe. The second group are communities that are specialized on certain regions like specific continents or countries. The third group, finally, focusses on special interest groups like mounting biking, diving, or travelling by motorcycle.

Figure 5.1.7 shows the end of the long tail with communities below 10 000 members divided by these three groups. As could have been expected the ratio between worldwide and regional forums changes if the sample is divided by this threshold. Above 10 000 the sample contains 10 worldwide forums and 7 regional forums, and below this threshold the sample contains 10 worldwide forums and 37 regional forums.

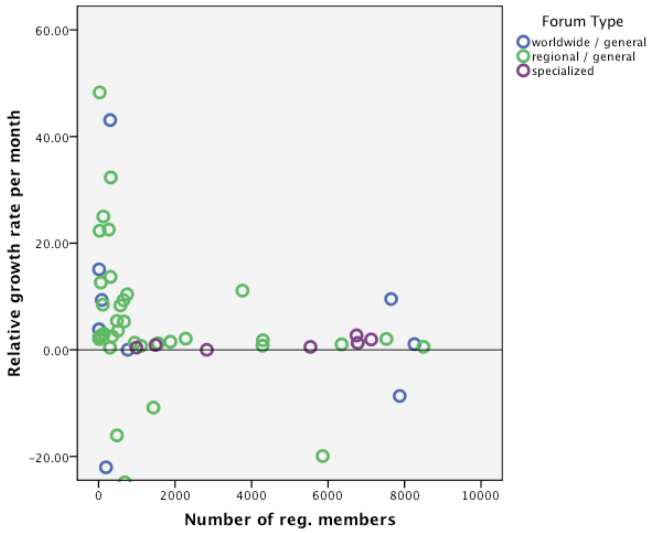

Figure 5.1.7: Relative growth rates for different forum types

Thus, we can conclude that there is a vast number of small communities that grow at a considerable rate. We assumed that regional forums in the end of the long tail would grow faster than worldwide. To diminish the effect of the extreme outliers within the sample we transformed the relative growth variable into a ranking scale and performed a non-parametric Kruskal Wallis Test. The mean ranks for the global forums as well as for the regional forums proved to be almost identical (36,47 and 37.42) whereas the specialized forums had lower mean ranks of 24.39. The test failed to reach significance with p=.212. Thus, the data indicate that small global communities grow at a similar rate as small regional communities.

Limitations

The research is yet limited due to the fact that the number of registered members in a forum is only a very indirect measurement of the activity within a forum. Future research has to substantiate our findings by additional measures like e.g. the number of written posts per month recorded over a longer period of time.

5.1.4 Discussion of the results - Study 1

With respect to the absolut numbers of registered members our sample shows an archetypical long tail. Very few travel communities with an exceedingly high number of members (ca. 100 000 members and more) are accompanied by a large amount of small communities (between ca. 10 members and ca. 30 000 members). With respect to growth rates, however, the data show that this long tail is not dead but shows considerable

average growth rates. Hence, the long tail does not seem to be populated by losers but rather by communities that are developing in a promising way. This leads to the question why end user would join a smaller travel community if they also have the chance to join a "market leader". This can have a number of reasons:

a) Differentiation. Some small communities might offer a special service or cover a special aspect that is not provided by the communities at the head of the tail. This might be related to special travel-related interests (e.g. diving, hiking) or special region-related coverage (e.g. communities specializing only on Thailand). However, our current data does not support this claim. There are more specialized communities at the long end of the tail compared to communities with a worldwide coverage. However, these worldwide communities show growth rates that are similar to the growth rates of the more specialized communities. Further analysis considering additional characteristics (like e.g. degree of commercialization etc.) has to show whether variables can be found that separate the long tail communities from the communities in the head of the tail. Another possibility is that the size of the community is a differentiating characteristic by itself. A number of Internet users might prefer smaller communities for different reasons: the risk of information overload is decreased, it is easier to gain a higher social status and the feeling of social belonging might be stronger in a smaller community.

b) Lack of transparency of the online community landscape. The idea of the network effect driven community market assumes that Internet end users have a choice to become a member of any arbitrary community. Obviously, this implies that Internet user have an overview over a more or less transparent market situation. Since central repositories for online (travel) communities are not very widely spread, most users probably do not even know what kind of choices they have. This might lead to a situation in which a user engages into the first online community she finds more or less suitable without being aware of other options. Further research especially in the field of information behaviour can yield fruitful insight as to how Internet users actually search for virtual communities and how they decide which one to join.

These results also underline the fact that online communities assumably do not only have positive feedback loops but also negative feedback loops as they increase in size. This negative feedback loop is caused by information overflow that can be caused if too many persons ask questions (this means for example that each question gets less attention) or

too many replies are given. In addition, the transaction costs are increasing for a single user if she has to manage relationships to many points within the social network of the community. This aspect sets online forums apart from cooperatively constructed online encyclopedia like Wikipedia. At least for the vast amount of passive consumers of Wikipedia, an increased user community only has the positive effect of increased quality without the negative effects of information overload or increased transaction costs. This might have led to the monopolistic position wikipedia is holding today.

This argumentation points to a relationship between community size and perceived value of an online forum that is rather characterized by a U-shaped function opening downward than by a steady increase as depicted in Figure 1. Further research should focus on the lower as well as on the upper bounderies of this value curve. This is also related to the question whether online forums need a minimum number of members for a sustained development. Our current data shows considerable relative growth rates for communities between 10 and 500 members. Additional future measure points of our sample will reveal whether these developments are persistent over time. Practical implications of this research arise especially for the field of online community development. Approaches in this domain up-to-now have often been of a prescriptive or design-oriented nature. These rules of community development, however, have to be complimented by quantitative models of online community evolution that are empirically well founded.

5.1.5 Forces in an online community market[20]

As pointed out in the previous section, online communities are likely to realize considerable network effects (Shapiro & Varian 1998). The value of the network increases when more members join the online community. Markets with strong network effects can lead to winner or loser markets. The individual players either realise a positive feedback loop and grow, or they do not gain enough initial momentum, realize a negative feedback loop and vanish. These considerations lead to question about the characteristics of this online tourism community market.

In the previous section, we have presented data about the number and growth levels of registered members for 74 online tourism communities. In our research, we showed that the community market was characterized by a power law or long tail distribution. Few exceedingly large communities (with respect to the number of registered members) were accompanied by a large number of communities that are orders of a magnitude smaller than that of the communities in the head of the long tail distribution. Further, we indicated that the absolute growth level of these communities was correlated with size. Larger communities grew more quickly than did smaller communities. While large growth levels were found for most big communities this difference disappeared when relative growth levels were calculated. Small communities showed considerable relative growth levels that were on a comparable level to that of large communities. This led to the question of whether smaller communities are likely to vanish or whether they can coexist with large ones. Formulated in a different way, the question remains as to how many communities can coexist in this market of online communities.

Based on the growth levels that were recorded for smaller communities, we hypothesize that the positive network effects that larger communities can realize are not the only force that influences the development of communities. Once the community grows beyond a certain size negative effects emerge as well. The individual community members may have more costs on finding persons with a promising answer in a large heterogeneous group of fellow community members. In a similar way, Jones et al. (2004) attribute the flattening of the population growth curve to cognitive processing limits that are experienced by users of virtual public places after a certain threshold has been reached. In addition, there are two motivating factors for the participation in online communities that might degrade once the community has reached a certain size: social

[20] This section was taken from: Aschoff, F.-R., Aschoff, M. & Schwabe, G. (2010). The market for online tourism communities. Full Paper. Proceedings of the 18th European Conference on Information Systems (ECIS). Pretoria, South Africa, June 6th - 9th, 2010.

status and reciprocity. In large heterogeneous groups it can be more difficult to reach a certain level of social status compared to a smaller homogeneous group. Also, if the idea of reciprocity is conceived at an individual level, it is more likely that a community member will interact with the same member again in a smaller community rather than in a larger community.

In the previous section, we only presented data on the number of registered members of several online tourism communities. The number of registered members, however, is only a very indirect measure for the activity in these communities. Against this theoretical background and based on the results of the last section, we collected additional data (especially the number of members that are actually online) to further describe the characteristics of this online tourism community market. More specifically, we asked:

1) Do the network effects lead to a monopolistic or oligopolistic market for online tourism communities or are niche strategies possible in the long-tail of the community distribution?
2) What enables smaller online tourism communities to persist against the competition of the large communities?

5.1.6 Method – Study 2

To answer these research questions we first collected a comprehensive number of online tourism communities. This research was done as a web search and started in February 2008. We only selected those communities that were classical forum based communities, i.e. communities that realized the typical question/answer structure of a forum (e.g. excluding wiki communities). Furthermore all communities had to deal with travel-related question. Thus, persons had to ask questions about their travel planning or behaviour (e.g. Can anyone recommend nice beach in South Italy to me?). We also selected communities with a certain level of travel-related specialization (e.g. diving, motorcycles). Criteria was that these communities had to have a considerable big section dealing with travel-related issues for these activities. For search engines we used Google, Yahoo, Altavista, Live Search, Mamma as well as the platform Boardreader. Keywords used were: “Travel Forum”, “Traveler Forum”, “Travel Board”, “Independent Traveler Forum”, “Independent Traveler” and “vbulletin travel”. The described procedure resulted in a sample of 122 travel communities. Thus, the basic sample for this section as well as from the previous section resulted from the same general search procedure. The analyzed

sample of communities, however, varies due to the fact that the respective indicators relevant for the different approaches cannot be recorded for all communities.

To assess the effects of market strategies, we created a sample that allowed us to monitor the number of registered members, the number of registered members currently online as well as the number of guests currently online over a period of time. For the number of registered members we collected data from December 23, 2008 to August 16, 2009 and for the number of members and guests currently online we collected data from May 18, 2009 to August 16, 2009. We included only communities that had 80% valid data recording for this measurement periods (for example excluding communities that were off-line for a considerable amount of time) and had to exclude some that were so severely spammed during the interval that they had hardly any travel-related content anymore. We wanted to have a clear separation between members online and guests online whereas members should be allowed to alter content and guests not. Few communities also allowed guests to alter content and where also excluded from the sample. These criteria resulted in a sample of 36 communities that were monitored during our measuring period four times a day in a six hour interval. The recorded numbers were the numbers published by the communities and were read out automatically.

To analyze the effects of the niche strategy on the community market we defined two dimensions of possible niche behaviour. 1) Regional scope, i.e. a travel community can possibly cover the entire globe as well as operate on a more regional level. We classified our sample into four categories: *Global* for all communities that on principal covered all areas of the globe. *Continental* for communities on specific continents (e.g. Asia). *Country* for communities on specific countries and *Local* for communities that covered regions below the country level. The second category was specialization, i.e. whether communities in addition to being general travel communities were further specialized. This could be a hobby (e.g. surfing) or also a special target group (e.g. low budget travelling). All communities that covered travelling in general were classified as "general" all the others were classified as "specific". These categorizations were based on obvious exclamation by the communities like the titles or obvious descriptions. Thus, we did not consider to which degree the community discourse actually covered these areas.

5.1.7 Results – Study 2

a) Community size

In a first step, we calculated the absolute community size with respect to the regional scope (Figure 5.1.8 a, b). On a descriptive level, we can see that the scope correspondents

to the size of the community. Global communities tend to be larger and communities with a more specific regional focus tend to be smaller. As shown in the previous section the community landscape follows a power law. Few very large communities are accompanied by many small communities. This in combination with the small N for some categories leads to the high variances and the large error bars.

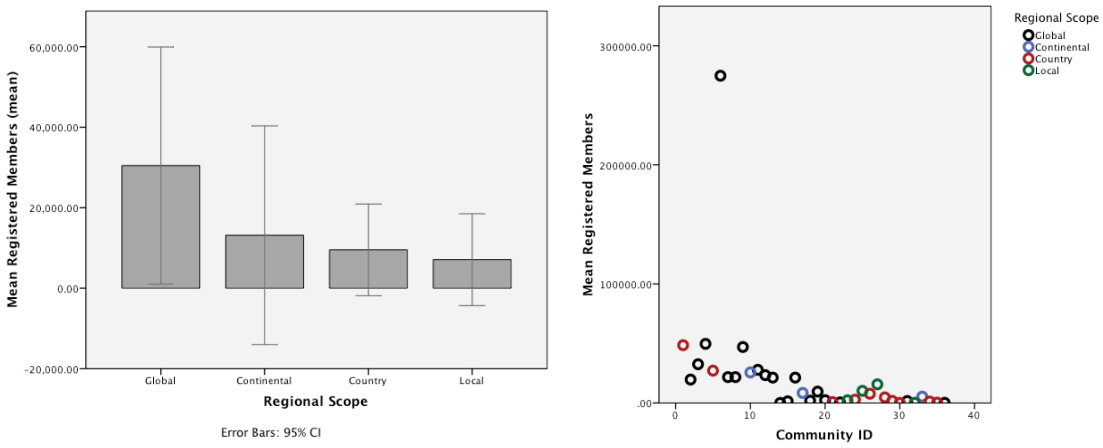

Figure 5.1.8 a, b: Mean registered members as well as scatter plot for regional categories (N: Global 19, Continental 2, Country 10, Local 4)

To show the sample more specifically we plotted the community landscape to show the size of the respective categories (Figure 5.1.8 b). This plot shows that most of the communities with larger size are global communities. The largest community in our sample is a global one and only two country-level communities are among the larger communities. Figure 5.1.9 a, b shows the same calculation for the general and the specific communities.

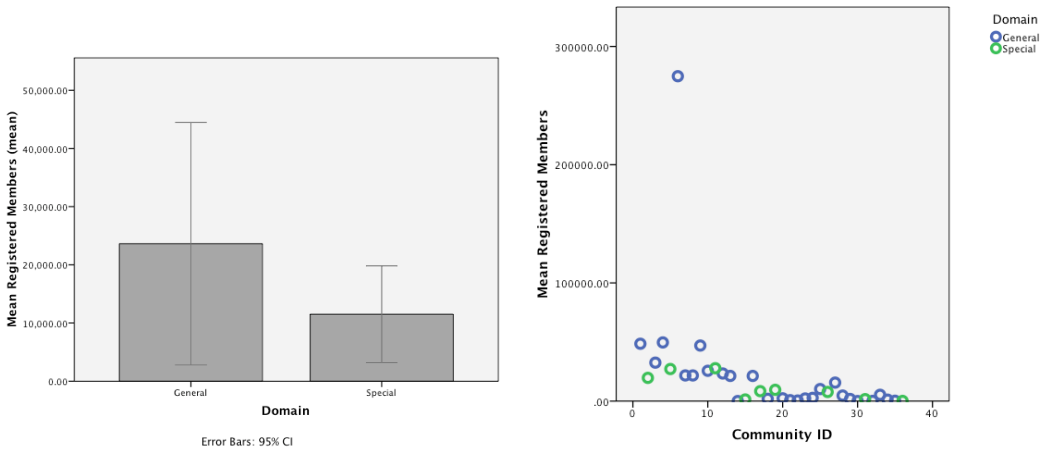

Figure 5.1.9 a, b: Mean registered members and scatter plot for the domain focus (N: General 27, special 9)

The categorization in general travel communities and more specialized communities shows similar tendencies. General communities tend to be larger than special communities. The plot shows that the four biggest communities are general communities.

b) Community Growth

We calculated the mean growth curve for the respective categories. These growth curves were calculated by fitting a regression line to the measured number of registered members over time for each community. The reported growth levels correspond to the gradients of these linear models for the respective communities.

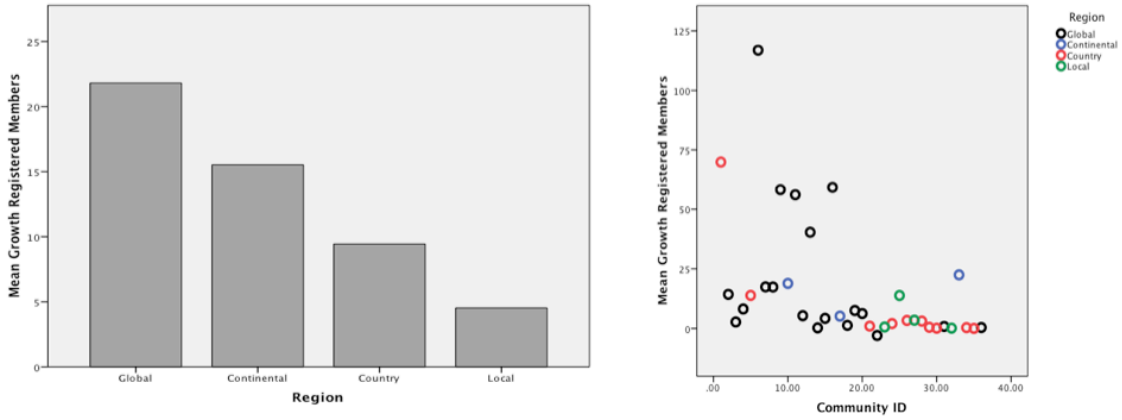

Figure 5.1.10 a, b: Mean growth of registered members as well as scatter plot for regional categories (N: Global 19, Continental 2, Country 10, Local 4)

The data show that global communities have a higher growth level. This connection is most likely mediated by the connection between size and growth as reported in the precious section. Only two country-level communities are among the communities with higher growth rates. Again the categorization into more general and more specific communities shows a similar picture (Figure 5.1.10).

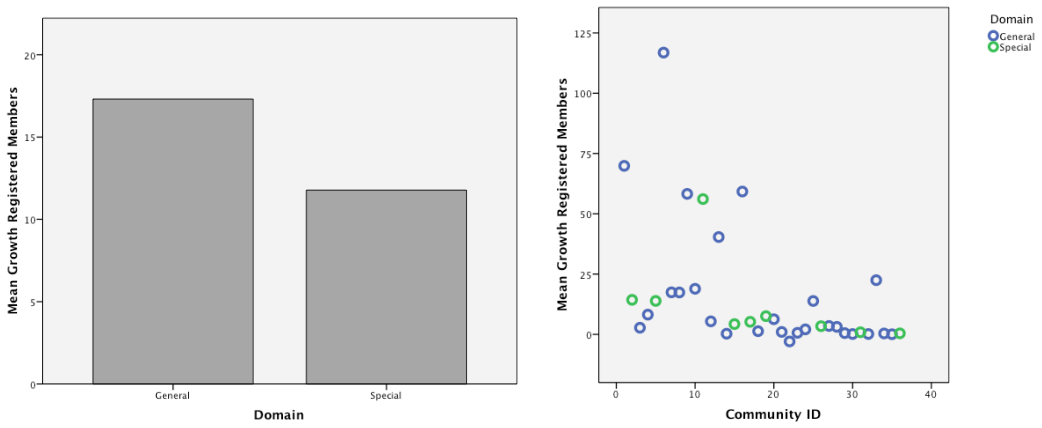

Figure 5.1.11 a, b: Mean growth of registered members and scatter plot for the domain focus (N: General 27, special 9)

c) Activity Level (persons online)

We also recorded the persons online separated by members online and guests online. Members online are registered members that are online and that are able to alter content. Guests are all persons that are looking at the page but are not logged in and are not able to ask or answer a question.

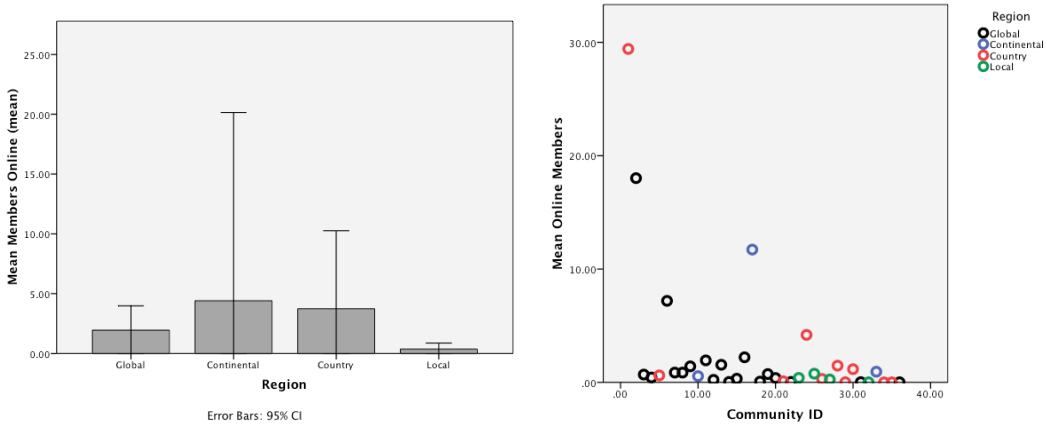

Figure 5.1.12 a, b: Mean members online as well as scatter plot for regional categories (N: Global 19, Continental 2, Country 10, Local 4)

We see that here the community with the highest number of members online is not a global community but a country-level community. There are two global communities and one continental community in the middle range. In the lower area there are again three country-level communities with a higher or a comparable activity level as the global communities (Figure 5.1.12).

We calculated the respective values for our domain distinction between general and special communities. We see, again, that special communities show higher numbers of persons online than general communities. We see that while the community with the highest level of activity is a general community, the two follow-up communities are special communities (Figure 5.1.13).

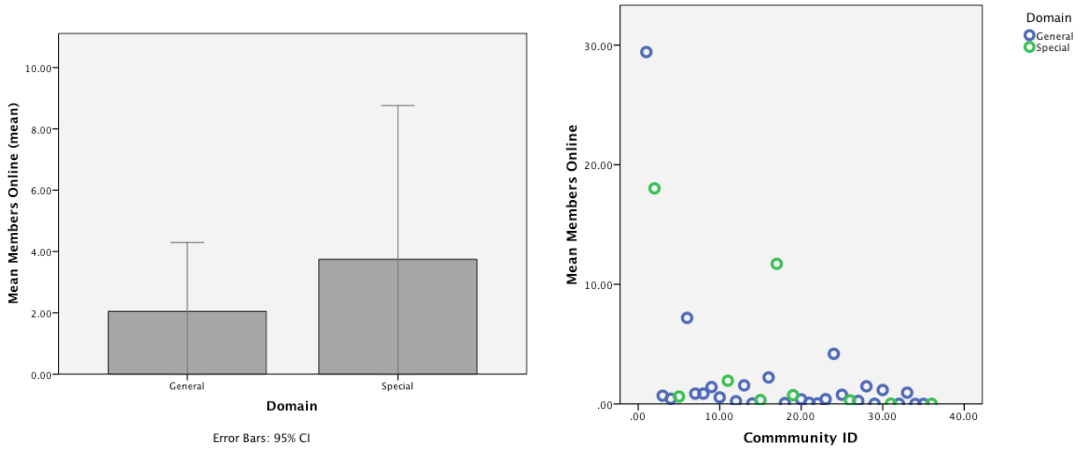

Figure 5.1.13 a, b: Mean members online as well as scatter plot for the domain focus (N: General 27, special 9)

In a next step, we combined the regional category with the domain category. Again, we obtained the same distribution schema as observed earlier. The higher descriptive numbers can be observed in the middle categories and the smaller numbers in the outer categories (Figure 5.1.14).

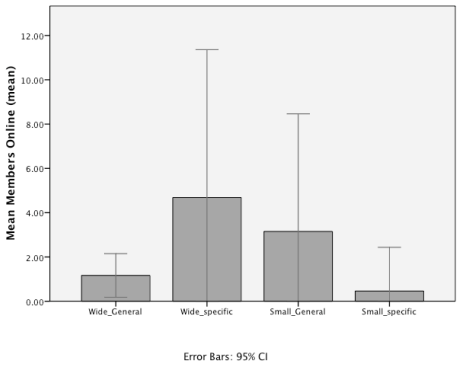

Figure 5.1.14: Mean members online (grouped)

In a follow up analysis, we calculated the relative share of members online, i.e., we calculated the percentage of members online for the global category as well as for the country category in relation to the total number of registered members (Figure 5.1.15).

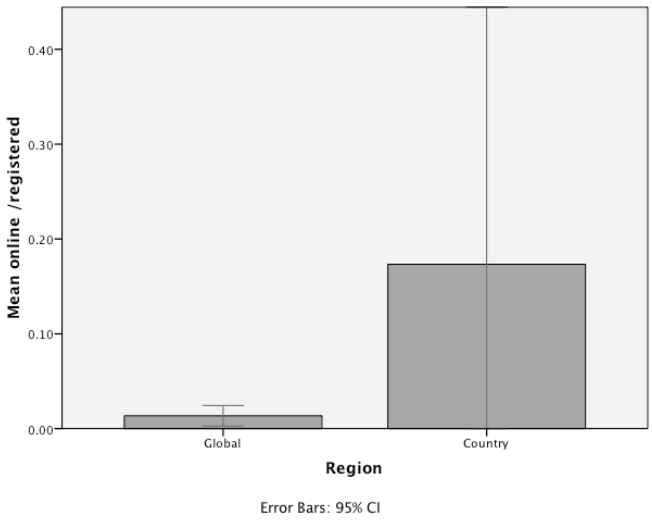

Figure 5.1.15: Mean members online divided by registered members

We calculated a t-test for these data which failed to reach significance (one-tailed, equal variances not assumed: p=0.149). Thus, we could not systematically show the effect for the entire sample due to the high variance and the size our sample has at the moment. We could show, however, that there are a number of regional communities that have a higher relative number of members online and even some regional communities that have a higher absolute number of members online than the global communities.

Finally, we also categorized which community platforms where used by the different communities. The results followed our expectations: The biggest communities have a self-developed software, medium size communities buy software, and small communities use freely available software. We also collected some data on the "commercialization" of our community sample. We see that most communities are embedded in a kind of commercial structure. They either create some revenue stream by displaying advertisement or are part of a bigger commercial structure where members of the community can also buy travel-related goods or travel books.

Limitations

Many of the described characteristics display a power law, i.e., very few large communities are accompanied by a large number of communities that are by order of magnitude smaller. This leads to high variances for our statistics. Due to this aspect and due the number of communities, that we were able to monitor, we were not yet able to show statistical significance for our observations.

5.1.8 Discussion

Based on our results we can describe the community landscape as having the following characteristics. Concerning the total number of registered members we see a typical power law or long-tail distribution. Few very large communities are accompanied by a large number of communities that are smaller by some orders of magnitude. These large communities – mostly generalized global communities (with self-developed software platforms) – draw a large number of member accounts. Their advantage from the perspective of the members are that a person interested in travelling does not need to change the community if he or she travels to a different country. These large communities probably also realize network effects, i.e. if there are more members the value of these social networks increases. But these large scope communities also have to cover an enormous terrain of knowledge. On principle they offer the service to satisfy every information need, i.e. questions concerning all regions of the globe covering all possible topics (from deep sea diving to low budget holidays with a family). This also means that they have to uphold a large infrastructure, in this case number of members and well structured subcategories, to answer this demand. If the scope increases it might be a mixed blessing for the members of this community: On principle the traveller can ask any questions he or she likes but it can prove to be more difficult to find an adequate answerer in the large heterogeneous group of community members.

This argumentation may shed light on the fact that communities with a smaller scope may have fewer difficulties in mobilizing their registered members to actually participate. Our data indicates that a number of these communities can mobilize a higher relative share of their registered members and that these tendencies can even lead to a comparable absolute higher number of members online. Here again we see a trade-off from the user perspective. If a user chooses to visit a more focused community she knows that she will most likely only get answers concerning the topic offered by the community and no answer to other topics that might also be of interest to her. However, if the community has some activity she also has a higher chance of meeting someone who has knowledge about this specific topic than if she would go into a more general community. For the large communities we probably see larger tendencies of social loafing and diffusion of responsibility. From the perspective of the individual member, the impact of the individual contribution (e.g. an answer to a question) decreases as the community size increases. This can lead to a feeling that the community can well persist without the contribution of the individual member and that there are numerous other people who can answer a posted question.

Regarding our research question we have evidence that the big players (in terms of registered members) do not dominate the market alone. The positive network effects for these large players do not seem to be so strong that they drive all the small players out of the market. Small to medium size communities mobilize a percentage of their registered members that can reach comparable or even higher total numbers than for the global communities. It seems that smaller communities can well persist in this market when they choose a niche and are able to tap into the right pool of persons with common interests. Thus, the advantage of smaller communities that focus on a niche topic can be seen in the *social cohesion* that drives up the user activity. The opposing force, from the user perspective, is the *convenience* of the large global communities. In these communities the user can stay within the same community regardless of his travel destination. Our data does not allow for making precise descriptions for all areas of the scope dimension. Based on the data, however, it seems plausible that the connection between the scope as well as the degree of mobilization is that of a reverse U-function. Communities with a very large scope have the problem of decreasing *social cohesion* whereas communities with an exceedingly smaller scope burden the member with high switching costs among several communities, i.e. lower *convenience*. A medium scope focus seems to a be good compromise for this trade-off.

The general goal of this research is to gain a better understanding of the tourism community landscape and of the factors influencing this market. Past research established a good understanding of many community-related aspects like the motivation of community members, the economic potential of communities or guidelines to develop communities. In contrast to this, however, our knowledge of the overall picture, i.e., the entirety of online communities on the web, is still weak. Understanding these factors might eventually allow us to develop models of online community evolution. Thus, we may be able to predict the success of a specific community or to predict general tendencies of the entire community field like economic research is doing it for industries.

Finally, we found that most communities are by now in some kind of commercial environment. Most communities use advertising as a means to generate revenue streams or the communities are bound into a rich socio-commercial structure (often attached to some brand) where members can communicate with one another but are also offered travel-related products such as flight tickets, hotels or travel guides. This may indicate that online communities on the Internet undergo a change towards increasing commercialization. The independent and autonomous virtual communities of the 80s and 90s which were also perceived as an alternative draft to the capitalistic real world seem to evolve more and more into social structures entangled with economic interests.

5.2 Exploring the activity-quality assumption[21]

In Section 4.3, we introduced the concept of internal discourse quality. In this section, we turn to the question which factors could have an impact on this kind of discourse quality and, thus, could be used to predict or influence it. To demonstrate the applicability and the usefulness of our measurement concept, we chose to research the impact of membership size. This parameter has repeatedly shown influential in post-hoc analysis in section 4.1 on completeness as well as in section 4.2 on timeliness. Following the idea of concatenation as proposed by Stebbins (2001; 2006), we will research this influence more systematically in the following analysis. The sample the following analysis is based on has already been described in Section 4.3.

While it might be a rule-of-thumb that communities with more active members are more useful than communities with less active members the connection between these two measures is actually non-trivial. The impact of group size on the productivity or efficiency of a group has been extensively researched. The findings of this comprehensive research, however, produced numerous contradictory results that prompted (Marwell & Oliver 1993) to refer to the "paradox" of group size. Essentially, as groups grow larger, positive as well as negative influences emerge. First, to start with the positive effects of a growing online community, there will be a larger number of persons who can reply to a submitted post. The likelihood thus increases of finding one or a few persons that are knowledgeable about the submitted topic of interest. Further, while the total number of possible repliers increases, this number can also have a positive impact on the individual's willingness to contribute replies. Butler (2001) refers to this aspect as "audience effect" arguing that the larger a crowd is, the more motivation a member has to submit a reply, as it will be received by a wider public. This aspect is related to an increased feeling of self-efficacy (aka Bandura 1995) when the possible number of persons who can appreciate a contribution is larger. These effects can influence the quantitative as well as qualitative reply measures: More members tend to produce more replies, and individual members might be more cautious regarding discourse discipline and content of reply due to the larger effect of their contributions since they will be read by more people.

[21] This section is taken from: Aschoff, F.-R., Schaer, V. & Schwabe, G. (2011). Where should I send my post? The concept of discourse quality in online communities and its dependency on membership size. Proceedings of the 5th International Conference on Communities & Technologies (C&T 2011). Brisbane, Australia, June 29th - July 2nd, 2011.

There are, however, numerous forces that counteract these positive aspects. First, forums suffer from information overload when too many members are participating, (cf. Jones et al. 2004). This can lead to posts just "flying by" without potential repliers having enough time to pay attention to the information requests, thus leaving many initial posts unanswered. On an individual level, there is also a force that counteracts the positive audience effect: diffusion of responsibility or social loafing. This can lead to a situation in which community members do not bother to reply because they deem that there are enough other community members who will reply. Further, a growing community membership can lead to a certain fuzziness of the social cohesion. This means that the number of weak links between community members probably increases. This might lead to a situation where a poster questions the worthiness of replying to an initial post that was sent by a weakly linked community member.

Finally, in addition to these described factors, we have to be aware that our conceptualization of discourse quality depends not only on the willingness of forum members to send replies to initial posts, but also on the number of initial posts that compete against each other for attention of all available community members. If the average willingness to send a reply to a post goes hand in hand with the average information need (i.e., number of submitted initial posts), the number of increased members could not solely account for a higher discourse quality.

Against the background of these contradictory empirical findings, we pose the following research question: *Can active membership size (i.e., the average number of members online) be regarded as a valid predictor of discourse quality in online forum communities?*

5.2.2 Results

Reply Quantity

Probability to receive at least one reply. Figure 5.2.1 shows the probability in every forum of receiving at least one reply. The data show that this probability is higher for highly active communities (at least 87% for the top 8 communities). To statistically assess the correlation between the average number of members online and the probability of getting at least one answer, we calculated the non-parametric Spearman's r_s test due to the non-normality of the average member distribution. This test resulted in a significant positive correlation ($r_s = .595$, $N=34$, $p<.001$, two-tailed).

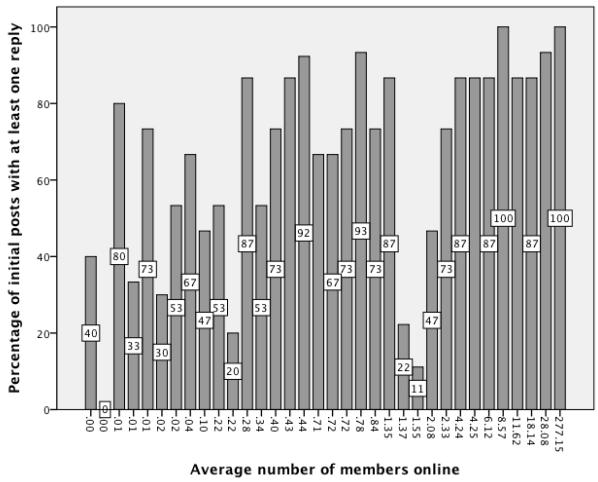

Figure 5.2.1: The reply probability for the 34 analyzed online forums

Waiting time until first reply. Figure 5.2.2 shows the average time in hours until the first reply to an initial post is received. Again, the data show that the communities with most members online (top 8) show a consistently low waiting period (for most threads within one day). For the remaining communities, the waiting time varies considerably. Some forums with few members online still show comparably short waiting times but the average waiting time is increasing considerably. The Spearman's r test resulted in a significant negative correlation ($r_s = -.705$, N=32, $p<.001$, two-tailed).

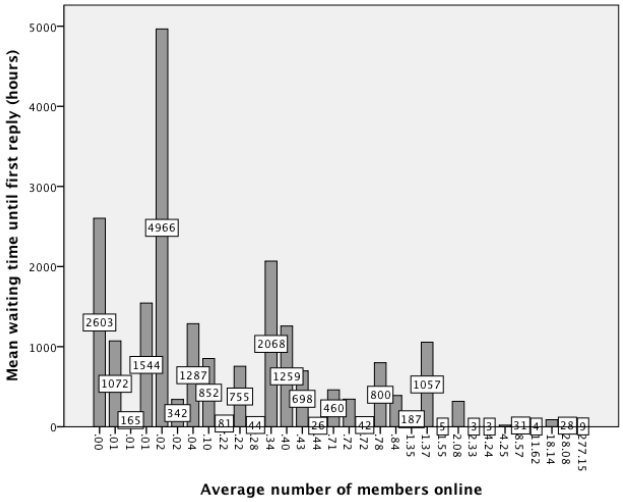

Figure 5.2.2: The mean waiting time until the first reply is received (in hours)

Average number of replies and posters. Figure 5.2.3 shows the average number of replies in all examined forums. Again, the data depict that more replies are received in highly active communities than in less active communities (an average of approximately 6 replies for very active communities). The Spearman's r test resulted in a significant positive correlation (r_s = .611, N=34, p<.001, two-tailed). We also find a significant positive correlation between the number of members online and the number of distinct posters.

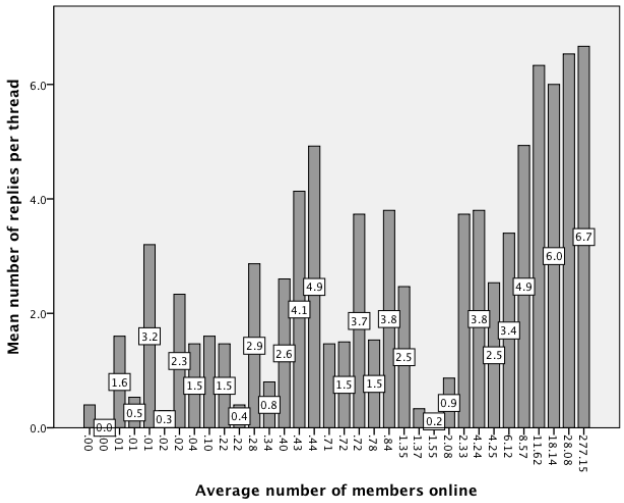

Figure 5.2.3: The number of average replies per initial post

Reply Quality

Reply Discipline. Figure 5.2.4 shows the percentage of on-topic and off-topic posts for each community. The data show that the vast majority of posts are related to the general topic of traveling; however, the data do not indicate a systematic increase of off-topic posts as the average number of community member increases. Our analysis of the measure "topical relationship with the initial post" shows a similar picture. Overall, the vast majority of the posts in our sample are related to the initial post. Even though the threads in forums with more online members tend to be longer, as shown previously, this does not lead to a systematically increased number of unrelated posts.

The nature of the initial post. As we discussed earlier, the initial post does not necessarily have to be a question but can also be a comment. Figure 6 shows the results of our initial post categorization. The figure indicates that a considerable number of initial posts are not classified as questions but as comments. Overall, the number of questions (54%) is only slightly higher than the number of comments. These comments include initial posts

where the poster gives an opinion, shares an experience, a viewpoint, and/or an evaluation with no visible purpose of obtaining information. Of course, in the context of an online forum, information exchange is one of the main drivers, and almost any kind of action will trigger a release of information.

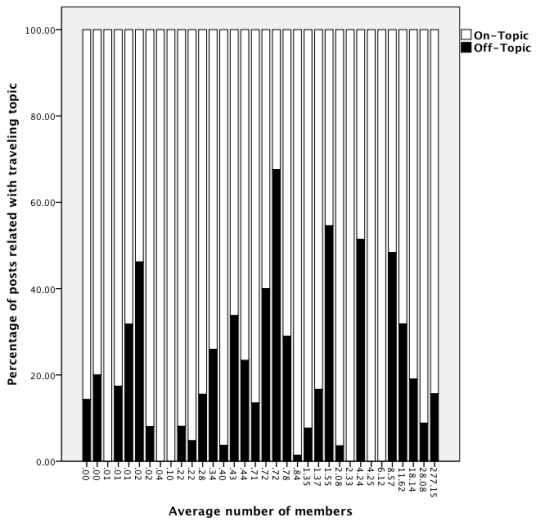

Figure 5.2.4: The percentage of On-Topic and Off-Topic posts for each community

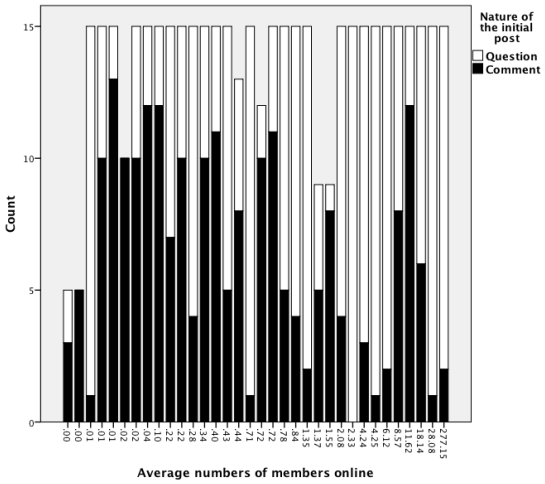

Figure 5.2.5: The number of questions as well as comments for the initial post

A review of the initial posts coded as comments depicts that in comparison to questions, comments can act as a social proxy for individual identification. For example, a user is sharing his/her travel experience in a very detailed and enthusiastic way in the form of a travel report or sharing pictures with brief texts.

Yet, not all comments were such a source of constructive information. Commercial activities and branding attempts were coded as comments, as some travel reports were implicitly commercially motivated or aimed at attracting consumers to certain destinations. Some of these underlying commercial posts were displayed as a mixture of personal comments and commercial purposes. For example, the initial poster comments on destinations for adventurous vacations included a link conducting the user to a commercial site. Still other comments included political discussions about certain destinations. As such issues are relevant for travelling trends, they usually receive a generous echo and become long threads.

As we analyze the distribution of comments across our community sample, we see that the number of comments tends to increase as the average number of members online decreases. Even though there are exceptions, most communities at the right end of the distribution have a higher share of questions in the form of initial posts, while the less active communities at the left-end of the distribution have a higher share of comments.

The nature of the replies. Figure 5.2.6 shows the results of our categorical system for the replies, indicating that the most common category is "explaining / answering," and the second most common category is "easy talk with no obvious informational value." The effects are not as strong as for the initial post, but the data show that the "easy talk" category is more common for less active communities than for highly active communities. Accordingly, we see a slightly higher share of "explaining / answering" in the forums with more online members.

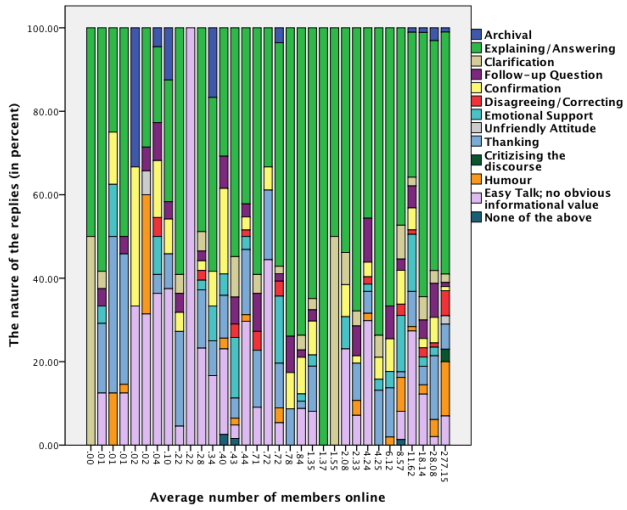

Figure 5.2.6: The categorization of the replies for each community in percentage.

5.2.3 Discussion and conclusion

The Internet is turning more and more from a static repository into a platform that enables socialization and knowledge exchange among Web users. This creates a great potential to satisfy individual social as well as informational needs. However, this also creates heterogeneous landscapes of social exchange platforms that lack transparency for the user. Which platform is useful and what kind of information or discourse quality can be expected from a certain platform often remains obscure.

A systematic understanding and empirical research of this phenomenon requires a common understanding about concepts such as usefulness and quality that allow a systematic assessment and comparison of different platforms. To contribute to this scientific endeavor, we have proposed a concept of discourse quality for online forum communities. This conceptualization is modeled from the user perspective and includes quantitative as well as qualitative measures.

To demonstrate the usefulness and applicability of this measurement construct, we have researched the impact of membership size on discourse quality. Our evidence shows that although there are theoretically contradictory forces when forums grow larger, membership size does have a predictive power regarding our concept of discourse quality. The results can be summarized as follows: If the communities are very active (an average of 4 or more members who are simultaneously online), the reply quality measures can be expected to be on a high level.

For communities with fewer members online, the data is more heterogeneous. Some of the smaller communities reach similar reply quantities as the very large ones, while others show clearly insufficient discourse quality. Additional influencing variables have to be identified to improve the prediction of discourse quality, especially for those communities in the “long tail.” Furthermore, our data show an emerging pattern indicating that the exchange-pattern in large communities differs when compared with smaller communities. Large communities have a higher share of question-answer pairs, while smaller communities show a higher share of "chit chat" that has no obvious informational value. This pattern could indicate self-enforcing loops: If the likelihood to receive useful replies is low in smaller communities, members tend to increase their socializing behavior, and thus incoming questions might receive fewer replies.

Regarding our concept of discourse quality, we see a contribution in the way that forum administrators can use this measurement construct for their internal quality management. Using a combination of different measurements (quantitative as well as qualitative), they would be able to target the weakest parts (e.g., by engaging moderators to improve the reply discipline). If measurement-constructs, such as the ones proposed,

were accepted and used, this would lead to greater transparency of the online forum landscape for both administrators and users. High discourse quality could be used not only as a positive signal to attract users but also to negotiate with sponsors and advertisers.

VI) MOVING FROM THE THEORY LEVEL TO THE TECHNOLOGY LEVEL: THE METAGORA META-COMMUNITY APPROACH

This part of the thesis deals with the practical application of the research findings that have been reported in previous sections. The discussion of research methods in the information systems research field has shown that this discipline follows the logic of the social sciences as well as an engineering paradigm that has recently been discussed under the term design science (e.g. Hevner et al. 2004). The social science approach seeks to identify relevant variable to describe human interaction and to understand the relationship among these variable. The underlying premise for this approach is that the researcher does not interfere with the social phenomenon he or she studies - or at least not to an extend that would systematically alter her research findings. The design science approach, on the other hand, has the goal to solve organizational problems by introducing an artifact. Design science research becames scientific due to the demand for rigorous evaluation and a continuously growing theoretically and empirically founded knowledge base (cf. Hevner et al. 2004). After previous sections have followed the logic of social science where relevant variables were identified and connected, we will now switch to a more design science oriented perspective. Therefore, we will propose a Web platform that supports users in finding online tourism communities with high information quality. This perspective puts our approach in the context of Web Information Retrieval research. We will, therefore, give a short overview of this field in the following sections and will point out how our platform can be a valuable extension of previous approaches.

The Web Information Retrieval field emerged from traditional information retrieval research. This discipline that deals with finding information in collection of documents (see Rijsbergen 1979 for an overview) has early roots in library science and became prominent when computer systems became able to store large amount of data since the 1950ies. Even though the Web can be understood as a large document retrieval space, Web information retrieval (see Aschoff & Bernstein 2008 for an overview) faces some decisive difference compared to the retrieval of data from systematic document collections (eg. cf. Lewandowski 2005). Firstly, the Web is structured in a decentralized way. While libraries or data bases usually have gatekeepers that control what kind of content enters the system and in what form, the Web does not. Library information systems or data bases are usually systematically structured in a way that meta-data text fields are rigorously defined. This allows for the application of systematic queries with a well defined output. The Web, on the other hand, is largely lacking these kind of systematic structure apart from some basic standard like the hyperlink logic. The user can

publish content in any prefered form and this content can be text or multi-media like audio, pictures or video. This makes an automatic categorization of the content difficult, since machines do have problems in categorizing this multi-media content. Finally, the users of these two systems show different characteristics. Librarians or persons operating data bases are usually trained experts who learned a certain formal retrieval language to extract information from the system. Web users, however, are information retrieval laymen with various educational backrounds and no formal training.

Even though these aspects show the challenges of a formal approach to Web information retrieval, key-word based search engines that automatically extract information from the Web are today the most used search tool on the Web. These search engines crawl the Web continuously, store the retrieved links in large data bases and make search results available based on certain relevance ratings. Besides features like word occurence and geographical region of the searching user, these relevance ratings also rely on the number of incoming links (cf. e.g. Brin & Page 1997). An approach that made Google the leading search engine. Despite this success, automatic key-word based search engines also have numerous disadvantage. One disadvantage is the fact that a high relevance ranking (for example on the Google search engine) are by now of big economic importance since in many cases it can link customer to products. For this reason companies undertake considerable effort to artificially increase the Google rankings (e.g. by automatically setting a vast amount of links pointing to their sites). This could lead to the situation that search results are not returned based on their relevance anymore but rather on the economic power of the site owner. In addition, the fact that most Web users are not trained retrieval specialist leads to users that are having difficulties in adequately expressing their information needs (cf. Jansen et al. 2000). Finally, key-word based search engines that automatically crawl the Web are not well equipped to categorize multi-media content like videos and audio files that can be found on the Web more and more.

To counteract the weakness of poor categorization as well as the problem of manipulation of the ranking algorithms social search approaches emerged. These social search approaches refer to activities where persons manually categorize web content. This content can be Web links (e.g. digg) or pictures (e.g. flikr) whereas tagging is one of the mostly used approaches. Since humans categorize this content it is done more reliable than by machines and a (automatic) manipulation cannot be easily achieved. On the other side, however, this activity requires human effort and even though social search communities can be of considerably size, they will most likely cover a smaller part of the Web than automatic crawlers.

Thus, we can summarize that key-word based automatic crawling approaches are efficient and scalable but prove difficult for human interaction. Social search approaches, on the other hand, might be more accurate regarding multi-media content but do not scale well since they require individual human effort. Furthermore, both of these approaches are document oriented rather than discourse oriented. The result of either a key-word based automatic search engine or a social search approach is usually a document, i.e. a text file, Web site or multi-media content. Considering the immense growth rates of content on the Web this approach makes it difficult to keep up with the vast number of growing documents. Furthermore, all these approaches that make categories explicit have to deal with the vocabulary problem (cf. Furnas et al. 1987), i.e. that terms that are used for document classification are not used consistently among the Web community. Finally, as people are interested in ever more current events, documents get outdated very fast.

Against this background, we propose the concept of a meta-platform to guide Web user to discourse space with high information quality. Online communities as such are discourse oriented, i.e. user can use natural language to obtain valuable information. Thus, online communities do not suffer form the restricted human-machine interface as key-word based search engines do. However, while Online communities have these advantages, they have the disadvantage that central repositories on the Web to find discourse spaces are rare. The proposed meta-community approach is meant to be a proposal in this direction.

6.1 The MetAgora meta-community concept[22]

Online communities (Preece 2000) have become an essential instrument for obtaining valuable information on the Web (cf. Ridings & Gefen 2004). Such communities have one major advantage over key-word based search engines: Members can formulate their information need using natural language. Thus, they can ask very open and complex questions and can add specific information about their personal backgrounds. Also, other community members can help to refine a previously fuzzy information need. Supporting this advantage, research on search engines shows that users have difficulties in adequately expressing their information need using key-word based interfaces. Some

[22] This section is taken from: Aschoff, F.-R. & Schwabe, G. (2010). MetAgora - A Meta-Community Approach to guide Users through the Diversity of Web Communities. Extended Abstracts of the ACM Conference on Human Factors in Computing Systems (CHI 2010). Atlanta, USA, April 5-10, 2010. Slight modifications were made.

users even deteriorate their search results by an erroneous use of Boolean operators (Jansen et al. 2000).

Despite these advantages, we see two problems, largely ignored by previous research, when Internet users interact with online communities:

1) How do Internet users find online communities that are appropriate for their discourse needs[23]?

Most research on user behavior and interaction with online communities starts at a point where the users are already members of certain communities. However, how Internet users actually find communities and how they decide which one to join, has rarely been investigated. The community landscape today appears to lack transparency and is very unstructured. Users often do not have the possibility to obtain an overview of available communities within a certain domain. There are only few platforms that aggregate online communities[24] but none have gained widespread use. Thus, we assume that users find their communities more by coincidence, by word-of-mouth, or by search engine queries that are not specialized for finding communities.

2) How do Internet users assess the discourse quality of a found community?[25]

Up-to-now, the user is offered very few cues as to whether a found online community is actually suitable for her information need and how helpful the future answers to her questions will be. Research on the answer quality of online communities in the travel domain has shown considerable variation in information quality between communities (Prestipino et al. 2006), and this is most likely the case for all knowledge domains. This problem is especially crucial since the switching costs of changing from one disappointing community to the next one are relatively high for the Internet user.

The aspect of answer quality in online communities and Question and Answer (Q&A) sites has recently gained considerable research attention (e.g., (Nam et al. 2009,

[23] This is a reconceptualization of the original paper. The original paper asked for „information needs“ and „information quality“. However, due to the way the MetAgora platform is conceptualized, we argue that these terms can be replaced by the introduced concept of „discourse“ needs and quality.

[24] For an exception see the www.boardtracker.com platform that is, however, not conceptualized as a meta-community

[25] see Footnote 21

Otterbacher 2009). All of these approaches, however, focus on the interaction of users with only one or very few communities. Thus, they take an "intra-community perspective" rather than an "inter-community perspective." This perspective neglects important differences in quality between communities and ignores the potential of predicting quality differences on this broader scale. For the user, it fails to realize the potential of interacting with more than one community, not leveraging the real potential that the existing variety of online communities could offer for the Internet user.

The MetAgora approach

Based on this analysis, we propose the concept of a meta-community. The meta-community can be conceived as being a social gateway that is connected to a vast number of online communities within a specific domain. The discourse in this meta-community is not supposed to be about concrete domain-relevant questions, but rather about entire communities or sub-communities. Members of the meta-community can add new communities, can rate and comment on communities and can engage in a discourse about them. In addition to this, it is a research platform to investigate inter-community differences and to identify features that allow the finding of high-quality communities (see Figure 6.1.1).

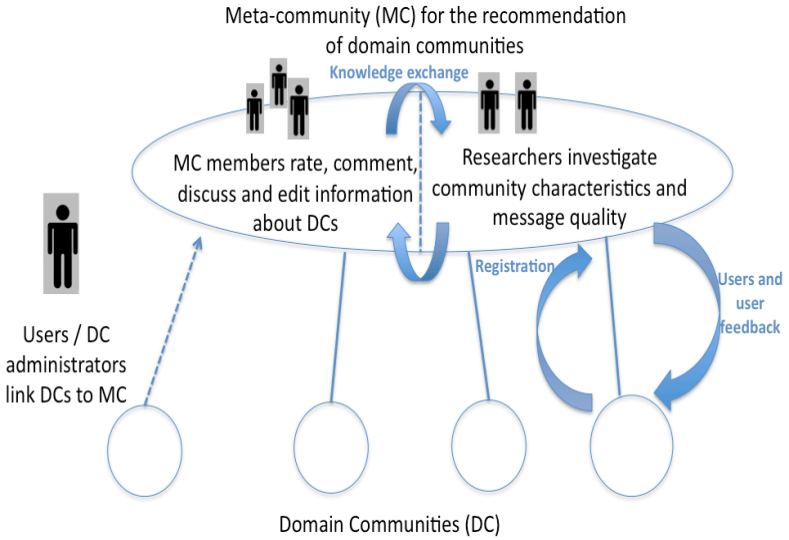

Figure 6.1.1.: The MetAgora Meta-Community Concept

6.2 The MetAgora prototype

We have developed such a meta-community prototype, called MetAgora, to demonstrate the feasibility of the described approach for the domain of online tourism communities. Technically, the prototype was realized by using Drupal 6, an open source web content management system (see Figure 6.1.2). Thus far, MetAgora contains about 120 different tourism forum communities (see Aschoff et al. 2009 for a more detailed description of the gathered communities.). The prototype allows users to filter the displayed communities according to a region (e.g., Asia) or a certain category (diving, low-budget, etc.). In addition, the user is able to rate the communities using a 10-point scale visualized by stars. Members are then able to sort all available communities according to the mean user ratings. Additionally, the user can add comments on a specific community that can be seen by other meta-community members.

Figure 6.1.2: Screenshot of the MetAgora Prototype

Further, we have implemented a quality rating, called the MetAgora rating. This rating is fueled by ongoing research on the characteristics of online tourism communities that was reported in previous sections. The goal is to identify forum characteristics that allow an automatic prediction of information quality in forum communities. This rating serves as another cue in addition to the user ratings and it also serves as a solution to the cold start problem for those communities that have not been rated by any user yet. For the first prototype, we implemented a rating based on activity measures (such as mean number of persons online). The assumption behind this approach is that there are findings that

indicate a relation between the activity level of forum members and the discourse quality in a respective forum (see previous sections).

6.3 User evaluation

We evaluated our prototype with 12 participants in order to get feedback on the perceived usefulness of the idea and the prototype, as well as being able to elicit further requirements. Most test users were students or had received a higher education degree and were paid for their time. Students of Computer Science were excluded to avoid a usability bias.

Procedure. We asked participants to imagine that they were planning their summer vacation and would like to use online tourism communities for information, after which they completed five tasks. For the first task, we did not specify the scenario much further. We asked them to look for travel communities that were of personal interest to them. We also allowed them to take their time to get acquainted with our website and browse through the available communities. The remaining four tasks were described more specifically to control the interaction scenario for different use cases. Here, we asked participants to search for specific pre-given communities, countries or domain categories. After finding a community on our MetAgora website, we asked participants to follow the link, visit the specific site and develop a first impression of the respective community. We then asked the participants to return to the MetAgora platform to rate the community with the five star scale and to formulate a comment. The entire procedure with the five tasks lasted about 60 minutes.

Measures. After each task, as well as at the end of the entire procedure, participants were asked what they liked and what they disliked about the interaction with the prototype (free text fields). In addition, participants were asked how they had coped with each task (5-point Likert scale) and filled out the SUS usability scale (Brooke 1996) after all tasks had been completed. We also asked for suggestions for improvement, and what cues the users had used to select their communities. Finally, we asked: How useful did you find the MetAgora website? and: How useful do you find the idea of presenting a number of online communities in this way, independent of our specific website? (5-point Likert scale).

Results. In general, the results showed that users had almost no problems using our website or completing the tasks we gave them. On the repeating questions of how users coped with our prototype after each task, the mean ratings were all between 3.9 and 4.75.

The overall SUS score amounted to 87.9, indicating an excellent usability according to Brooke 1996.

Concerning the free text fields asking what participants liked, most mentioned that the site was well structured (named by 11 participants) and that communities could easily be found. One participant mentioned the fact that there was an "official" rating by the MetAgora researchers that was independent of the user rating. With respect to the negative aspects, participants mostly commented that there were still too few communities available on the platform and that they would like additional information about communities (mentioned by five participants).

Regarding the cues that participants used to select a specific community, seven mentioned the ratings (the stars), whereas five did not specify which exact rating they had used. One user specifically referred to having used the MetAgora ranking, and another specifically mentioned the user ratings. Additional cues were the comment fields, as well as the community title.

The question: How useful did you find our prototype? was answered with a mean of 4.0 on the 5-point Likert scale, and the question: How useful did you find the idea of presenting communities in this way in general? was answered with a 4.66. In addition, our participants gave a lot of valuable input for the further development of the prototype. The comment fields showed that participants instantly found the intended level of discourse, and as described above, some mentioned that the reading of others' comments was helpful in selecting their communities. Examples of participants' comments on specific communities were: "*very bad oc. threads are flooded with off-topic posts…";* "*...good information on beaches and surfing…"* or "*..too much advertisement..too few information.."*

6.4 Discussion

Even though online communities have proven valuable for the satisfaction of information needs, we identified problems from a user's perspective, especially with regard to finding and selecting helpful communities on the Internet. As a solution to this situation, we proposed the concept of a meta-community that guides users to Internet communities relevant to their information needs. In a proof-of-concept study of our meta-community prototype, we show that users easily engage in a discourse level that describes advantages and disadvantages of domain communities. In addition, users give high marks for the usefulness of our prototype, as well as for the concept in general. In the following sections we offer several implications of our approach.

Implications for the domain communities:

We see a benefit for domain communities in the fact that our approach can lead to a better allocation of users (or expertise) to the knowledge domain of different communities. It has been known for a long time that rather passive members can account for a considerable share of the total members in an online community (Nonnecke & Preece 2000). This might be the general nature of communities and is not necessarily a problem. However, for a sustainable development, every community needs to acquire a minimum number of active users who must provide a sufficient share of useful contributions. With the MetAgora approach, we see the chances increased that a person that is genuinely interested in a topic finds the right community and, thus, will be more likely to actively contribute to this community than to an arbitrary community found by chance.

In addition, the MetAgora platform can present valuable user feedback for domain communities. It shows all the positive and negative comments about a certain community and creates a feedback level that has not been realized before. Administrators, community developers, as well as members, can acquire relevant input for the further development of the community. On the other hand, the approach might also lead to disadvantages for (some) domain communities. If the MetAgora platform successfully increases the transparency among Internet communities, this might favor some communities and discriminate against others. It might lead to a situation where successful communities become more successful, and less successful ones become even less successful. Finally, we are aware that a meta-community could have considerable influence regarding the incentive structure of domain communities (like social status and expectation of reciprocity.)

Implications for the Internet user:

The Internet user has the obvious advantage that the meta-community presents her with an overview of available online communities for respective knowledge domains. The platform functions as an aggregator for possible social places to visit on the Internet. In addition, the user receives qualitative and quantitative feedback for the communities. She can take this as base for her decision as to which community she should become a member of.

In addition to this, the approach creates a new aggregation level for finding relevant information. The users can be guided directly to a helpful answer if this answer is stored in the community's archive. But the user is also guided to a discourse space

where the topic of interest is discussed. The Internet has become more and more dynamic over the years, especially since user-generated content accounts for an increasingly bigger share of content. The fact that anyone can create content about anything in real-time leads to the situation that the content is of varying quality and that many facts are outdated shortly after publication. Thus, we see it as an advantage that users are provided not only with some kind of stored answer, but also with the location where the discourse takes place, and where questions can be answered more precisely than with conventional search engine queries.

Implications for Community Researchers:

Finally, the MetAgora prototype provides a promising platform to research the community landscape and to develop prediction models of discourse quality in online forum communities. Further research has to focus on a better understanding of user interaction with the meta-community prototype as well as on the potential to expand the concept to other knowledge domains.

VII) MOVING FROM THE TECHNOLOGY LEVEL TO THE THEORY LEVEL: TOWARDS A NORMATIVE THEORY TO EXPLAIN DISCOURSE QUALITY IN COMMUNITY-BASED DISCOURSE SPACES

In previous sections on the theoretical level, we provided exploratory evidence on discourse quality, membership size as well as the influence of the scope. Based on these insights as well as on previous scientific findings by others, we will propose a first theoretical attempt to coherently describe the influences of these variables on the discourse quality.

For an understanding of the concept of a theory in information systems research, we build on Gregor's (2006) work. She describes theories as *abstract entities that aim to describe, explain, and enhance understanding of the world and, in some cases, to provide predictions of what will happen in the future and to give a basis for intervention and action.* We also recognize Poppers (1935) position of critical-rationalism that demands that theories should be testable and falsifiable.

For the construction of our theory we took Robert O. Briggs' seminar on research methods[26] as an orientation. Briggs describes a theory as a causal model that is internally consistent, explains or predicts, proposes mechanisms of causation and is testable. We explicate the following guidelines, most of which are based on Briggs' course:

1) A theoretical approach should explicitly define the phenomenon of interest.
2) A theoretical approach should clearly define the scope of the theory, i.e. explicating which phenomena are included and excluded from theoretical explanations and predictions.
3) A theoretical approach should explicate a "Who cares?" argument.
4) The structure of a theory consists of axioms and propositions.

In the following sections we will propose a theoretical approach targeting discourse quality following the explicated guidelines:

1 and 2) Phenomenon of interest and scope of theoretical approach
The phenomenon of interest is the quality of the discourse in community-based discourse spaces. As explicated earlier, by discourse we mean the exchange of statements among two or more participants. By quality, we mean the quality as it can be measured by the discourse quality framework explicated in Section 4, with a special focus on the internal

[26] Briggs, R.O. Course on Research Methods in Information Systems Research. University of Zürich. 2011.

discourse quality. In addition to this, the *discourse space* is an important concept of our theoretical approach. We argue that our theoretical approach applies to community-based discourse spaces with the following characteristics:

a) Community-based discourse spaces are open to the public, i.e. everybody interested in the topic of the discourse can, on principle, participate.

b) The members of such a discourse space participate by self-selection and are not appointed by a central authority.

c) Every member of the discourse space can, on principle, participate, i.e. listen to the statements of others and make their own statements (by "on principle" we mean that there are no formal rules that would prevent anybody from contributing. We are aware, however, that individual motivation, social selection and social pressure in a discourse space can have a strong influence on who is actually contributing and to what degree).

d) The community-based discourse space is open and public in the sense that every statement can be perceived by every member of the discourse space (private discussion spaces or sub-spaces for specific topics are not covered).

3) "Who cares?" argument
The theoretical approach describes a relevant social phenomenon in the sense that it explains influencing factors on the discourse quality in online communities. We argued that this level of abstraction can be fruitful for the Web Information Retrieval field since it allows for an exchange of knowledge and a creation of social capital that cannot be realized by a document-centered perspective.

7.1 Components of our theoretical approach

In this section, we will propose a first attempt to formulate a formative discourse quality theory called the Activity-Scope theory. Based on the exploratory findings in Section 5, we propose the number of members as well as the scope to be important influencing variables of the discourse quality in online communities (see Figure 7.1). In the following sections, we will explicate and operationalize each of these components.

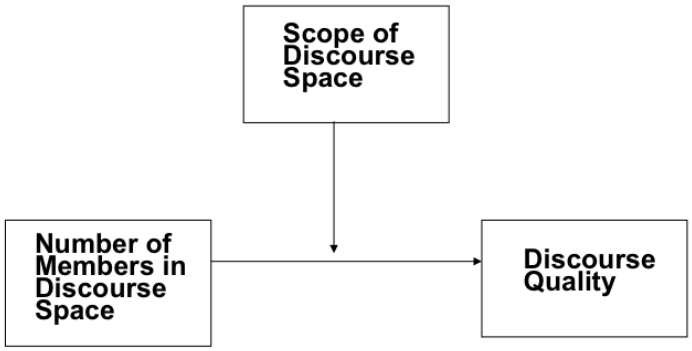

Figure 7.1. General Research Model of the Activity Scope Theory

7.1.2. Number of members of the discourse space

We chose the number of members of the discourse space as a crucial influencing variable since we argue that this is one of the most important variables for a growing community. A new community that does not attract new members will not be successful, no matter how well designed the community platform is. The common effort to establish a high discourse quality on a community platform can be understood as a public good problem since the contributions to the discourse (i.e. sent posts) are non-rival and non-excludable. A person who reads a reply after another person usually has the same benefit as the first person and a message that is sent into the discourse space can be perceived by all members of the discourse space. Even though there might be an intuitive understanding that more members are good for a community, the relationship between number of members and discourse quality is not actually trivial. The empirical findings on the influence of group size on the provision of collective goods are contradictory, and Marwell & Oliver (1993) refer to the "paradox of group size" in this context. Finally, a number of previous studies pointed to the number of members or member activity as an important influencing factor for information quality in online communities (cf. Section 4 and 5).

7.1.3 The topical scope of the discourse space

Finally, we propose the topical scope of the discourse space to be a crucial factor in understanding the relationship between the number of members and the discourse quality. By scope we mean the topical breadth of the topic that the discourse space is labeled with. Taking the example of a travel community, the breadth of a discourse space could be

"Traveling the Globe", "Traveling Europe", or "Traveling Italy". Thus, the scope of a discourse space cannot be measured in absolute terms but can be determined in comparison with other discourse spaces. Note that, by this scope, we do not refer to the various topics that are emerging in the discourse space among the users. We refer to the label that is given to the discourse space by the community administrator (usually the name, e.g., of a forum) and that is used by a Web user as a base for the decision to enter the discourse space or not.

7.2 Propositions of the Activity-Scope Theory

7.2.1 The relationship between number of members and discourse quality

In the general research model (Figure 7.2.1), we assumed that the number of members influences the discourse quality and that the scope is a moderator of this relationship. We will now propose a more complex model that considers mediating forces to explain the relationship between the number of members and the discourse quality. We argue that the number of members itself does not increase or decrease the discourse quality but that this relationship is characterized by a number of mediating factors. These factors are the common ground among the discourse members, the contribution incentives, information overload as well as social cohesion. We will first argue how these factors mediate the relationship between the number of discourse members and the discourse quality (see Figure 7.3. for an overview of the propositions) and will, subsequently, argue how they are affected by the scope, resulting in the proposed moderating function.

Common Ground

A discourse can only take place if the members of the discourse space share a common ground. Our concept of common ground is based on the constructs explicated by Clark (1996). He states that: "Two people's common ground is, in effect, the sum of their mutual, common, or joint knowledge, beliefs, and suppositions." Thus, we argue that the concept of a common ground includes the knowledge bases of the discourse members bring with them as they enter the room as well as their preferences regarding social interaction. In his research, Clark (1996) focused on how common ground can jointly be established whereas we concentrate on the preconditions people bring with them as they enter the discourse space. Thus, we argue that as Web users enter the discourse space their interest and knowledge backgrounds can overlap to a higher or lower degree (see Figure 7.3). We would refer to the overlap between two or more backgrounds as common ground. The common ground can be operationalized and measured by question targeting the meta-knowledge of the discourse members regarding the discourse space. One

approach would be to give the discourse members a list of possible information needs (e.g. " I have problems installing the Linux operating system".) The participants are then asked to assess whether they deem this question on-topic or off-topic for the respective discussion space. The number of correct matches could be considered as an indicator of common ground.

If the discourse members are assembled by a decentralized self-selection process among Web users that are interested in the topic of the discourse space, a larger number of members should statistically lead to more overlap and, thus, to more common ground. Imagine, for example, a discourse space that deals with "Computer operating systems". If there are only a few users in this discourse space it is unlikely that two users share the same problem. This likelihood is increased as the number of members increases.

Proposition 1.1: The more discourse members are in a discourse space, the more common ground exists among the members.

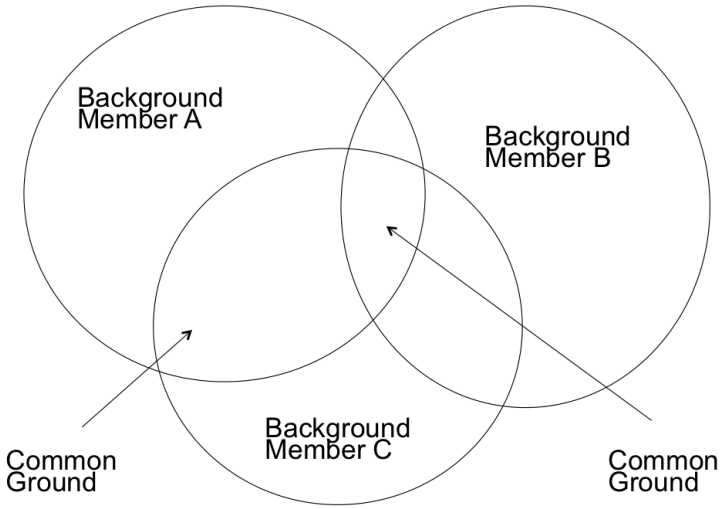

Figure 7.3 The Concept of Common Discourse Backgrounds

More common ground among discourse members means that the likelihood of a match between a discourse seeker and a potential replier increases. Thus, more discourse requests should be answered and, more importantly, due to the shared knowledge and interest background the replies, should be more targeted and more specific with reference to a possible information need. The thread consistency should increase an unfavorable behavior like flaming, and personal insults should decrease.

Proposition 1.2: The more common ground exists among the discourse members, the higher the discourse quality in a discourse space.

Contribution Incentives

Gaining reputation is considered to be one crucial motivating factor for users to contribute to an online community. A related concept to this is self-efficacy as explicated by Bandura (1995). This concept assumes that persons like the impression that they can make a difference in this world and that their actions have an effect. The incentive to contribute can be measured by items like "I find it rewarding to participate in the forum exchange" or "I think I can reach a lot of people when posting to the forum". The concept that connects this need to the number of members in the discourse space is what Butler (2001) calls the "audience resource". For someone who would like to get a message out to the world (and these psychological concepts assume that every one has this tendency more or less), it is more attractive when the number of recipients is larger. Therefore, the incentive to contribute becomes larger as the number of discourse members increase.

Proposition 2.1: The more discourse members are in a discourse space, the stronger the contribution incentives are for the members.

The contribution incentives that are mainly based on the "audience resource" will motivate members to contribute more replies and also to contribute faster. The aspect of contributing faster is a special motivational effect based on the assumption that the first (good) reply will have the most impact for the question asker. It will receive a lot of attention through the question answer and might be more likely to lead to "thank you" replies. In addition, all the other members of the discourse space will be especially attentive to the first reply. Furthermore, we assume that this kind of contribution incentive that is based on the audience resource does not only apply to the quantitative number of replies but also to the quality of the replies.

Proposition 2.2: The stronger the contribution incentives are for the discourse members, the higher the discourse quality in a discourse space.

Information Overload

By definition, all members of a discourse space are, on principle, able to contribute to all posts by all other members. Thus, as the number of members in a space increases, it becomes increasingly difficult to follow all initial posts and all replies that are submitted in the discourse space. The information overload in a room can be assessed by items like "I frequently loose track of the conversation", or "There is too much going on in this forum". This aspect is especially crucial because the communication is not coordinated. At any point in time, messages about any topic from any member can be submitted into

the discourse space. Thus, while a person tries to understand an initial post and tries to decide whether this post is relevant, there will be additional messages entering the zone of attention. Here, we assume that more members will write a greater total of messages than fewer members.

Proposition 3.1: The more discourse members are in a discourse space, the stronger the information overload experienced by the members.

If discourse members suffer from information overload, their performance in replying will decrease. Jones, Ravid & Rafaeli (2004) found evidence that users are more likely to respond to simpler messages in overloaded mass interaction and that users are more likely to generate simpler responses as the overloading of mass interaction increases. Thus, we assume that the limited cognitive capacity that is created by the information overload problem leads to a poorer discourse quality.

Proposition 3.2: The stronger the information overload that is perceived by the discourse members, the lower the discourse quality in the discourse space.

Social Cohesion

By social cohesion we mean the degree to which a community member feels responsible for other community members. The social cohesion can be addressed by items that target the feeling of social belonging (e.g. "I feel connected to the other persons of the forum") As the community grows the number of weak links (cf. Granovetter 1973) between the community members increases. This leads to a situation in which the social bonds between the discourse members decrease because each member has, on average, fewer interactions with all other members.

Proposition 4.1: The more discourse members are in a discourse space, the weaker the social cohesion among the members is.

A decreasing social cohesion usually results in a number of negative effects regarding cooperative social behavior. Tendencies of social loafing will increase, as well as the diffusion of responsibility. This will lead to a situation in which discourse space members will not reply to a discourse request because they assume that other discourse members will do it instead.

Proposition 4.2: The lower the social cohesion among the discourse members, the lower the discourse quality in the discourse space.

Note that the discourse quality in discourse space does not only depend on the number and quality of the contributions by the discourse members, but also on the number of discourse requests, i.e. initial posts. These discourse requests compete for the attention of discourse contributors. For the sake of simplicity of the current model, we assume that

the number of discourse requests per discourse member stays the same as the number of discourse members increases.

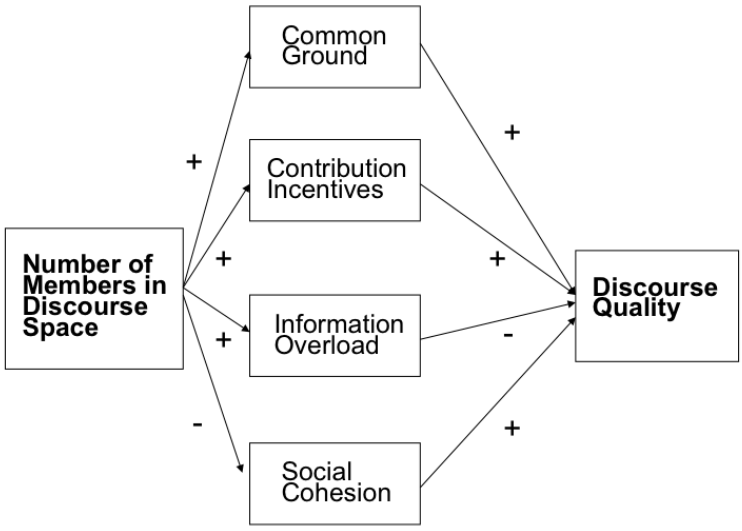

Figure 7.4 Propositions for the relationship between number of discourse members and the discourse quality

Impact of the four factors as the number of discourse members increases

As the discussion around the paradox influence of group size for public good scenarios already showed, contradictory influences emerge as groups grow larger. We argue that these forces do not neutralize each other in a discourse space, because they become effective to a different degree as the number of members of the discourse space increases. We assume the relationship between the number of members and the discourse quality to be an s-shaped curve as depicted in Figure 7.5.

We assume that, at first, the discourse quality only increases very slowly. This is due to the limited common ground as well as the lack of incentives to contribute. At one point, the slope of the line increases considerably. We argue that this is the point where the common ground effect and the contribution incentives have their strongest impact. This point is related to the critical mass point that has been discussed in the literature (Markus 1987). Thus, we have a zone on the curve where the positive effects of the common ground effect and the contribution incentives are effective, whereas the negative effects of information overload and decreasing social cohesion are not very strong, yet. At a later stage of the curve, these negative factors become increasingly influential as the number of members increases.

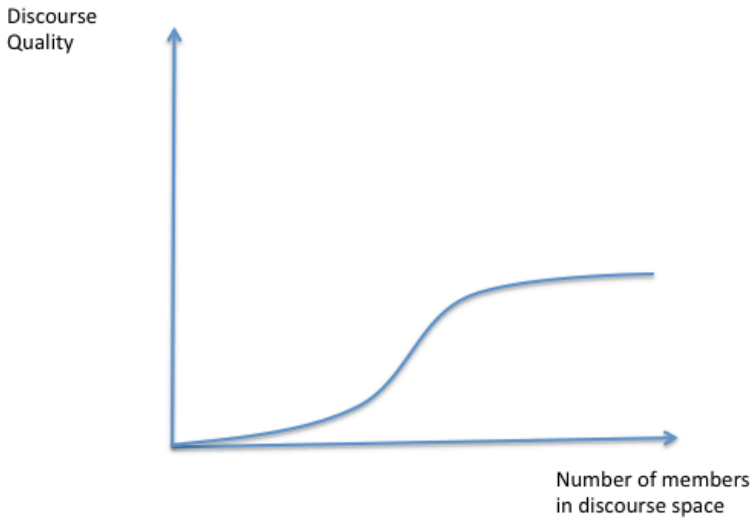

Figure 7.5 The number of members – discourse quality curve

Consequently, the discourse quality is hardly improving anymore. Note that we did not assume a considerable decline of the discourse quality because we assume that the members of an online discourse space will leave the discourse space as soon as the discourse quality decreases due to overcrowding. This also means that from a certain point on, we do not expect a further increase of members in the discussion space. Therefore, we propose:

Proposition 5: A discourse space with more members will have a better discourse quality than a discourse space with less members.

7.2.2 The influence of the discourse space scope

In the following paragraphs, we will explain how the scope of the discourse space influences the four mediation variables (see Figure 7.6 for an overview of the propositions). The scope of a discourse room can have different levels, e.g. it can be around "computer operating systems", "UNIX operating systems", or a specific problem of the UNIX operating system.

If the scope of the discourse room is comparably broad, and the space draws users from the Web that join the room based on self-selection, the likelihood of an overlap of their knowledge base or interest background is lower. The reason for this is that a broader topic has multiple sub-facets. Thus, Web users that are interesting in the broad overall topic may actually have quite diverging interests on a sublevel. Furthermore, the

declaration of a broad topic is vulnerable to more misunderstandings than more specific topics. That means people's understanding of what is actually discussed in this room is diffuse, as is the self-selection criteria of whether they actually fit in the space or not. On the other hand, a more specific scope should have the opposite effects. Thus we propose:
Proposition 6: A more specific scope leads to more common ground among the members of the discourse space.

For us a more specific scope has also the effect that the motivation to contribute based on the presence of other members is increased. We argue that the "audience resource" is not only an effect that is based on the pure number of discourse members, it also depends on the kind of audience. As we argued, a more specific scope will draw people that are more similar together, i.e. those that have a more similar background. We argue that the "audience effect" is much stronger in this case, because then the other members of the discourse space are perceived as "one of one's own kind". In this case, it feels more rewarding when those persons appreciate a contribution. This creates a feeling of attachment and the wish to be recognized by one's peers. Thus, we propose:
Proposition 7: A more specific scope leads to increased contribution incentives for the members of the discourse space.
We also argue that a broader topic has effects on the perceived level of information overload. The rationale behind this is an increased diversity of messages that are sent in a broad topic room. Thus, for every message that is sent into the room, the discourse members have to categorize this message and decide whether it makes sense for him or her to attend to the message. For more diverse topics, it is more difficult for people to do this. Moreover, if the topic is broader, persons will more likely use a vocabulary that is not shared by everybody in the discourse space. A more specific topic, on the other hand, should have the reverse effect.
Proposition 8: A more specific scope leads to a decreased information overload for the members of the discourse space.

A more specific scope should lead to persons that are more similar to each other joining the discourse space. This feeling of similarity should increase the bond between the discourse members, and persons should feel more connected to one another.
Proposition 9: A more specific scope leads to an increased social cohesion among the members of the discourse space.

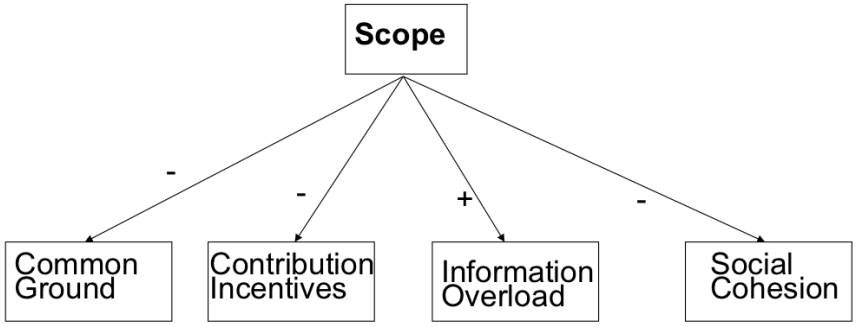

Figure 7.6. Propositions for the impact of the scope on the four factors

To summarize: Since a broader scope has a negative influence on the common ground, the contribution incentives and the social cohesion, but a positive effect on information overload, the overall moderating effect of the scope is negative (see Figure 7.6).

Proposition 10: The number of members-discourse quality relationship is negatively moderated by the topical scope of the discourse space.

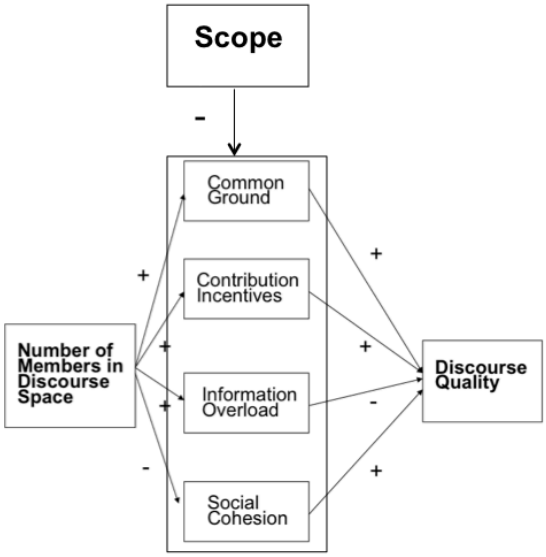

Figure 7.7. Overview of the propositions of the activity-scope theory

7.3 Implications and discussion

In this contribution, we argued that previous approaches that addressed the communication among community members failed to adequately capture the phenomenon of discourse quality. Therefore, we specified what we mean by community discourse and proposed the concept of discourse spaces. Subsequently, we proposed a measuring framework to assess the discourse quality in different online communities. Then, we proposed our activity-scope theory to explain how the discourse quality varies among different communities. This theory explains the relationship between the number of members of a discourse space, the topical scope of this discourse as well as the resulting discourse quality. We argue that these connections can be explained by four mediating variables: the common ground, the contribution incentives, information overload as well as social cohesion. The scope also influences these four variables and therefore functions as a moderator between number of members and discourse quality.

The scope is actually linked to the aspect of how a discourse space can be split into a number of different discourse spaces. For example, the discourse space about "America" will, as the number of members increases, at some point reach the flat part of the discourse quality curve. At that point, a further increase of members does not add much to the discourse quality and the number of members will not increase anymore. Therefore, it seems advisable to split the room into two rooms: one covering "North America" and the other covering "South America". Let us assume that the members of the original discourse space would split evenly into the two new ones. Thus, the number of members in these two discourse spaces would obviously be lower than in the original one. However, due to the decreased scope, the common ground as well as the contribution incentives would be increased. The problematic aspects of information overload and decreasing social cohesion, however, would be eliminated due to the decreased number of members. This strategy allows the entire community to add new discourse spaces and, thus, continually increase its number of members. The caveat of such a splitting strategy is that the community administrator has to take care not to split rooms with too few members. This could lead to a situation where the new rooms have a number of members below the critical mass point. This could lead to an emigration of members and could endanger the sustainable growth of the community.

In a larger context, we see the relevance of our approach against the background of increased socializing activities that evolve online. The Web, which used to mainly be a document repository for most users during the 90s, has turned more and more into a

platform for social exchange. In this regard, we believe the conceptualization of discourse quality at the abstract level of the discourse space to be promising. The discourse space has certain advantages in contrast to single documents or answers. Documents tend to become outdated quickly in the dynamic settings of today's media world. A discourse space, however, is assumed to be fairly stable over time and those discourse spaces with high discourse quality are expected to be a source of fresh and timely information.

We assume that the number of online discourses that are led on the Web is increasing considerably. The decisive difference between online discourses and off-line discourses is the fact that online discourses could, on principle, be selected by Web users with minimal switching costs. However, this potential that the Web user can become a member of any open discourse on the Web can only be realized if we seek to understand the nature of these discourses as well as their influencing factors. The activity-scope theory is meant to lead to criteria for the selection of discourse spaces by Web users, but is also meant to support community administrators in designing discourse spaces with high discourse quality to provide a rich communicational experience for the community members.

VIII) OUTLOOK: THE NEXT TECHNOLOGY CYCLE

Developing the Activity-Scope theory in Section 7 has sharpened the idea of the discourse space as a platform of social exchange with limited capacity. In a next round of prototypical development, we intend to implement this idea. Thereby, we are seeking to achieve three purposes: Firstly, to further improve the platform that was presented in Section 6, i.e. to make it more useful for Web users; secondly, to further sharpen our theoretical understanding of the concept of a discourse space; and thirdly, by implementing this prototype, to collect data to research the Activity-Scope theory.

For Web users, the disadvantage of the MetAgora 1.0 prototype has been the fact that online forum communities (e.g. Thorn Tree, Virtual Tourist etc.) are just names of Web URLs. They are not semantic categories the users can connect something to. Thus, the indicator that was presented in the MetAgora 1.0 prototype was targeted towards an entire community usually having multiple sub-forums (i.e. discourse spaces). This led to the situation that the user had to orient herself on our webpage and was then guided to a Web community that required orientation again. This structure led to an inefficient access to high community quality. Our study in Section 4.3 indicated that the activity of the Web communities has some predictive validity regarding the discourse quality of the community. However, when we have a large community with multiple sub-forums, we have to be aware that the quality in this community may still vary considerably.

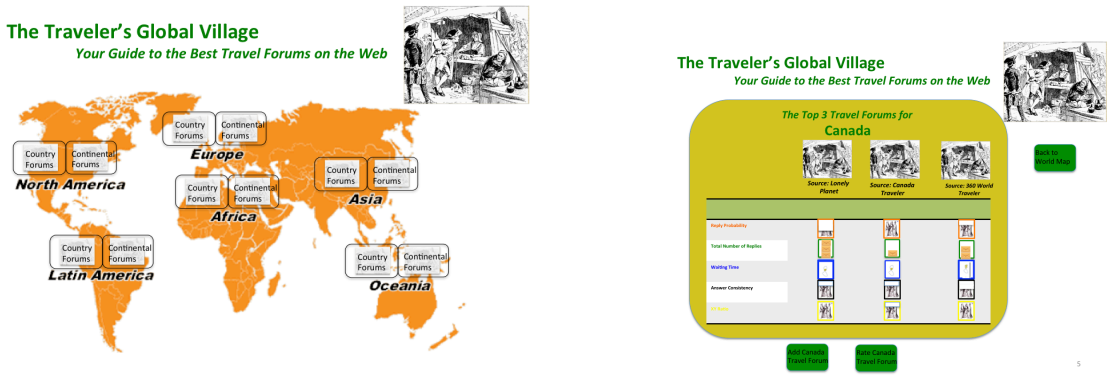

Figure 7.1 Examples of wireframes for the next prototype

For these reasons, we decided to target the concept of discourse spaces with the next generation prototype, i.e. the prototype would guide users directly to sub-categories that are not subdivided any further (e.g. Italy, South Africa, Family Travel etc.). Figure 7.1 shows examples of the Wireframes for this new prototype.

IX) GENERAL DISCUSSION, IMPLICATION AND FURTHER RESEARCH DIRECTIONS

Currently, we are experiencing considerable changes in the way information is distributed in our society. The "Gutenberg" business model that has been in place for about 500 years has not vanished yet. This model is based on a centralized production of content and on a commercial distribution of this content to rather passive content consumers. However, it is likely that we are in a transition phase. The "Gutenberg" model is accompanied – and may eventually be replaced – by a virtual community-based model. The Internet lowers transaction costs to such an extent that (business) models of information distribution became possible in the last decade that would not have succeeded in the centuries before. One of these models is the user-centered generation of information where Web users provide valuable content for each other without monetary incentives.

This community-based content production model offers a lot of potential and, at the same time, poses considerable challenges for Web users as well as Web engineers. One advantage of the community-based model is that it further lowers transaction costs for Web users. From an economic perspective, the decreased transaction costs of communities are probably one of their main advantages. Communities brought people together with different skills, but with the joint goal of living together. By this means, trade could develop and specialized skills (bakery, blacksmith etc.) emerged to the mutual benefit of all community members. Thus, the community allowed a standard of living that could barely be achieved alone because the individual costs to produce all necessary or useful goods would have been too high.

The virtual community takes this lowering of transaction costs to the next level. On the Web, a user can become a member of dozens of communities for every domain of interest. This has created what we could call a "long tail" of communities as well as a "long tail" of possible relationships. The term "long tail" in this context has been introduced by Anderson (2006), who used it to describe the fact that consumers are now offered a large variety (statistically speaking a "long tail") of products. This phenomenon is due to decreased costs of producing and especially distributing goods via digital channels. We would argue that the same holds for online communities. The Web also allows the creation of communities that are highly specialized. For very specific niche topics (e.g. rare diseases), there might not be enough people in one place to reach the critical mass needed to form a community in the off-line world. On-line, however, the few persons that are interested in this specific subject around the globe can join and communicate via easy-to-use digital channels.

As we have pointed out before, we would argue that there at least two challenges in this new multiple community scenario from a user perspective: 1) How can users find an appropriate online community, and 2) How can they assess the usefulness of the found communities? The results of our systematic evaluations showed that user-generated content can, on principle, be on the same level as commercial content. There are community-based travel platforms that have a higher information quality compared to commercially printed travel guides. On the other hand, however, there are those communities that show a lower information quality. As an implication, this means that neither of these two processes seem, on principle, superior to the other. User-generated content platforms can beat their commercial counterparts. We would argue, however, that commercial content providers still have important advantages when it comes to attracting consumers. This advantage resides in the trust consumers tend to have in institutions such as brands. Industrial companies try to communicate a certain brand and attached to this they guarantee a certain minimum quality standard. This reduces the quality uncertainty (cf. Akerlof 1970) that is associated with all experience products.

Community-based approaches, on the other hand, do not have similar functions or at least they are not as well understood yet. The attributes that determine the quality of an online community are much more unclear. Even though there are certain rules-of-thumb as discussed in Section 4, these indicators have hardly been researched with regards to validity. Web search engines have fostered the flourishing of the Web as a ubiquitous communication medium considerably, without reducing the potential that emerged from de-centrality. For the landscape of Web communities, we argue these kind of support technologies are largely lacking still. To make a contribution in this direction, we presented the following aspects in this thesis:

1) A conceptualization and measuring framework for discourse quality in online travel communities
2) Empirical findings regarding the discourse quality potential of community-based distribution models vs. commercially-based distribution models
3) A comprehensive description of the online travel community landscape as well as influencing factors for discourse quality
4) A proposition of a theory that explains influencing factors of discourse quality
5) A meta-community concept that was implemented in a platform tested by users

Regarding the limitations, the following aspects are to be discussed: The components of our framework were based on previous literature as well as on research intuition. In an

exploratory approach, we intended to describe phenomena such as timeliness and the internal discourse quality as accurately as possible. This approach allowed for an in-depth analysis of the important factors as well as a modeling of the connection between these factors. While a promising start to capture the main elements of our phenomenon space, the validity (i.e. does the framework measure what it pretends to measure?) needs to be validated in further research activities. This can, for example, be done by discussing the framework with members of online travel communities and obtaining feedback on our proposed dimensions. In addition to this, the numbers of our analysis on the community level are relatively small. Due to the difficult sampling, it is difficult to systematically compare numerous communities and to reach levels of statistical significance. This calls for an automatization of our approaches (e.g. of the manual code book, possibly using automated essay grading tools or respective approaches). This would allow us to analyze a larger number of communities and would also lead to promising approaches for support mechanisms of the meta-community platform approach. Finally, it would allow to test the propositions of the activity scope theory. Therefore, we propose the following steps for further research:

1) A continuous refinement and validation of the discourse quality framework
2) Approaches to automatize our manual-coding schema to make our approach viable for large-scale data analysis from Web communities
3) A further increase of our theoretical understanding of discourse quality
4) A continuous development of our meta-community Web platform to attract more users, thereby being able to further research user-community interaction patterns in multi-community environments

If we were able to guide users more precisely to useful communities with regards to their points of interest, we would considerably increase their social and informational benefits. More users would be able to find answers to their questions and more users with common expertise and common interests could be brought together. Thus, we propose the conceptualization of the Web as a community of communities with unprecedented potential for knowledge as well as social exchange among world citizens.

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APPENDIX A:

The Codebook:

Reply Discipline

I) Travelling Topic

a) Definition and coding instructions: This variable measures whether the post is related to the topic of travelling. With this variable we investigate whether the community is seriously committed to the general purpose of the travelling and tourism domain or if the community is misused for other purposes (like sex advertisement, the selling of goods or if a thread is primarily used to insult people or disturb the community by flaming (troll activity)).

a) Codes

1. On-Topic: The post talks about tourism and/or travelling. It is relevant to the objectives of travelling, the target groups are clearly related to tourism and/or travelling, it is relevant to target audiences interested in tourism and/or travelling.

2. Off-Topic: The post is not related to tourism or travelling. For example, political discussions or discussions about the culture but with no connection to travelling, users do not express the intention of travelling; their comments and/or questions are not related to travel or tourism.

3. Socializing: Off topic, but helping to support the discussion (moderation) or general member support

II) Relationships between Posts and Initial Post

b) Codes

1. Topical relationship with Initial Post: A post contains relevant information when it answers the initial poster's question or refers to the initial poster's comment, when it gives information, clarifies or complements the initial post's content, dealing specifically with the topic, geographic area, and/or subject of the previous post

2. No topical relationship with Initial post: The post does not specifically aboard the issues that arise in the initial post; it is incoherent, not traceable and bares not relationship with the initial post's thematic in the broad sense.

III) Kind of Initial Post

a) Definition and Coding Instructions

b) Codes

1. Question: All posts in which the poster seeks for information or data, they are written with the purpose of obtaining information, including for clarification purposes. The

presence of a question mark can be a hint but is not obligatory. The poster might seek concrete information, prices, recommendations or support for an action. (Thus, this could be compared to an information pull act.) This is in relation to Zhu (1996) who examined type I questions or information-seeking questions are posed when information is missing, while type II questions or discussing questions are used to provide some kind of information, to seek opinions or to start a dialogue. Also Bullen (1997), who operationalizes critical thinking, distinguishes between positive indicators: (a) focusing on a question, (b) analysing arguments, (c) asking and answering questions of clarification, and (d) defining terms and judging definitions; and negative indicators are (a) focusing on a question unrelated to the problem, (b) analysing arguments inappropriately, (c) asking inappropriate or irrelevant questions, or (d) incorrectly answering questions of clarification and incorrectly defining terms and inappropriately judging definitions.

2. Comment: All posts in which the poster gives an opinion, shares an experience, a viewpoint, and evaluation with no visible purpose of obtaining information or data. (Thus, this could be compared to an information push act.) When examining the responses to the initial post Henri (1992) is particularly useful, he uses a similar variable, but further distinguishes between a direct commentary (any statement taking up and pursuing an expressed idea, using direct reference) and an indirect commentary (any statement taking up and pursuing an expressed idea, but without referring to the original message).

3. Other: Posts that contain no clearly defined character. They cannot be identified as either question or comment.

IV) Kind of Reply

a) Definition and coding instructions: This variable is used to characterize the posts, know what kind of information or attitudes they contain. All of these reactions can either come from a person who replies to the Initial Poster (or some subsequent posting) or they can also come from the Initial Poster itself. Up to two codes can be selected for this variable. When more than 2 are applicable, the coder must choose the two most prominent aspects and code the most prominent first.

Codes:

1. Archival function. The reply repeats, summarizes, integrates, and/or interprets information.

2. Explanatory function (Answering): The reply gives answers to the questions, explains an issue, gives information, contributes with ideas, offers options.

3. Attempt to clarify: The reply seeks to clarify a previous aspect or the information need of the initial poster. This can include formulations such as “Did you mean….” Or “Can you provide more information about…”
4. Follow-up question: The reply contains mainly a follow-up question that develops out of previous discours. It can either be posted by the Initial Poster or by another poster. In contrast to the code “attempt to clarify” this code refers to a reply with a question, inquiry or statement that conducts the discussion in a new direction or asks for further details on the already existing body of posts.
5. Confirmation: The reply confirms, supports, agrees with previous posts.
6. Disagreeing and correcting function: The reply expresses disagreement, disconformity, and controversy with respect to previous postings. It corrects someone, proves someone false, contradicts a previous post, is not in favour of what was previously expressed.
7. Emotional Support / Empathy/ Friendly attitude: The reply contains mainly an emotional support. It encourages or cheers up a previous poster.
8. Unfriendly attitude: The poster might be making fun of something or someone, insulting.
9. Thanking: The poster thanks, expressed gratitude. Positive remarks about the forum discourse in general. This can also be be posted by the Initial Poster or by any other poster.
10. Critizising the discourse: General critique about the discourse. This can refer to the informational value of the discourse or can refer to social aspects of the discourse.
11. Offering excuses: The poster excuses himself/herself for a comment or reaction.
12. Humour: The post contains humour, in a positive sense. The poster might be using funny words, providing amusement, or using irony.
13. Easy talk, general remarks to sustain conversation but with no obvious or visible informational value.
14. None of the above; please specify _____